

FIG. 1

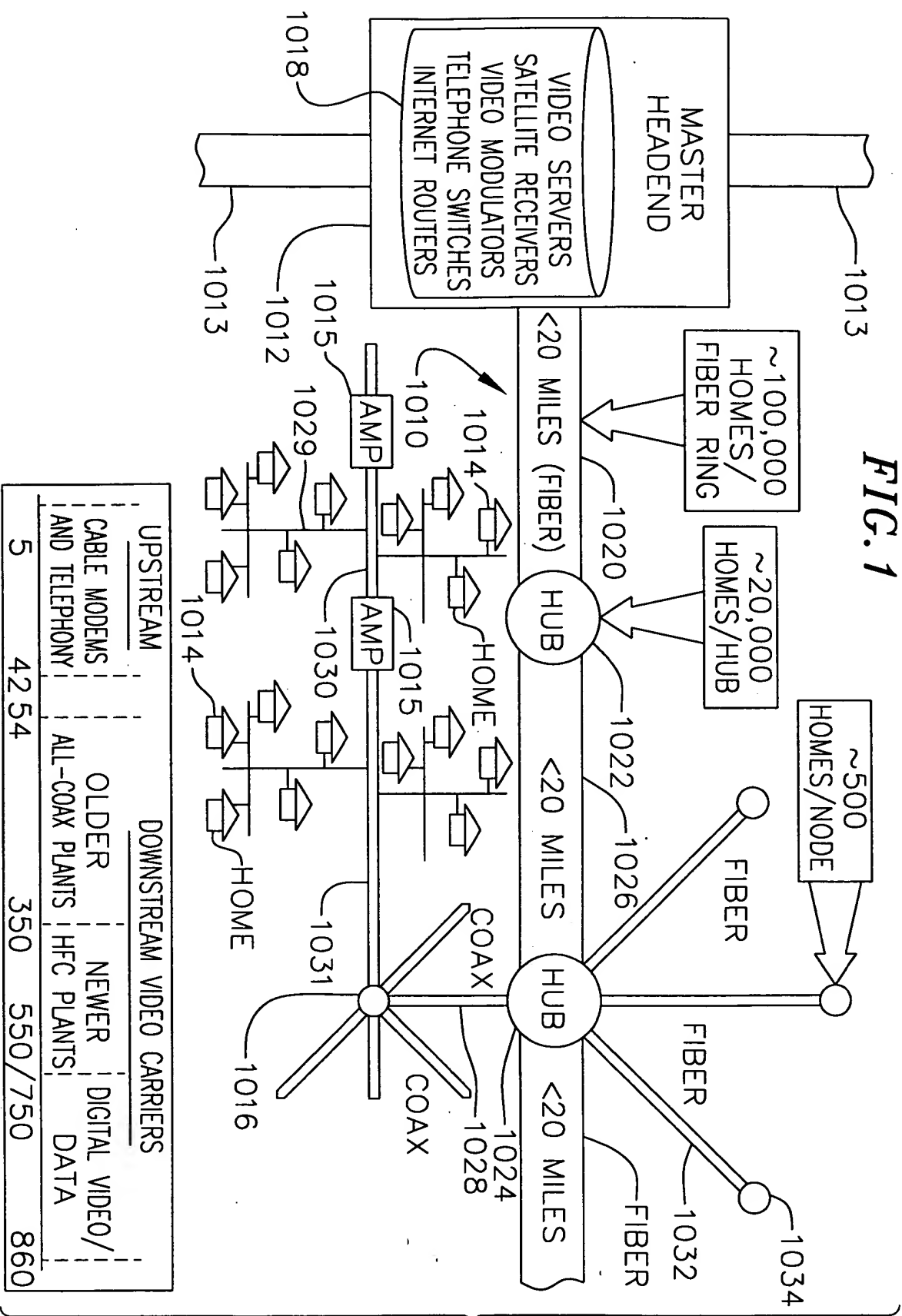


FIG. 2

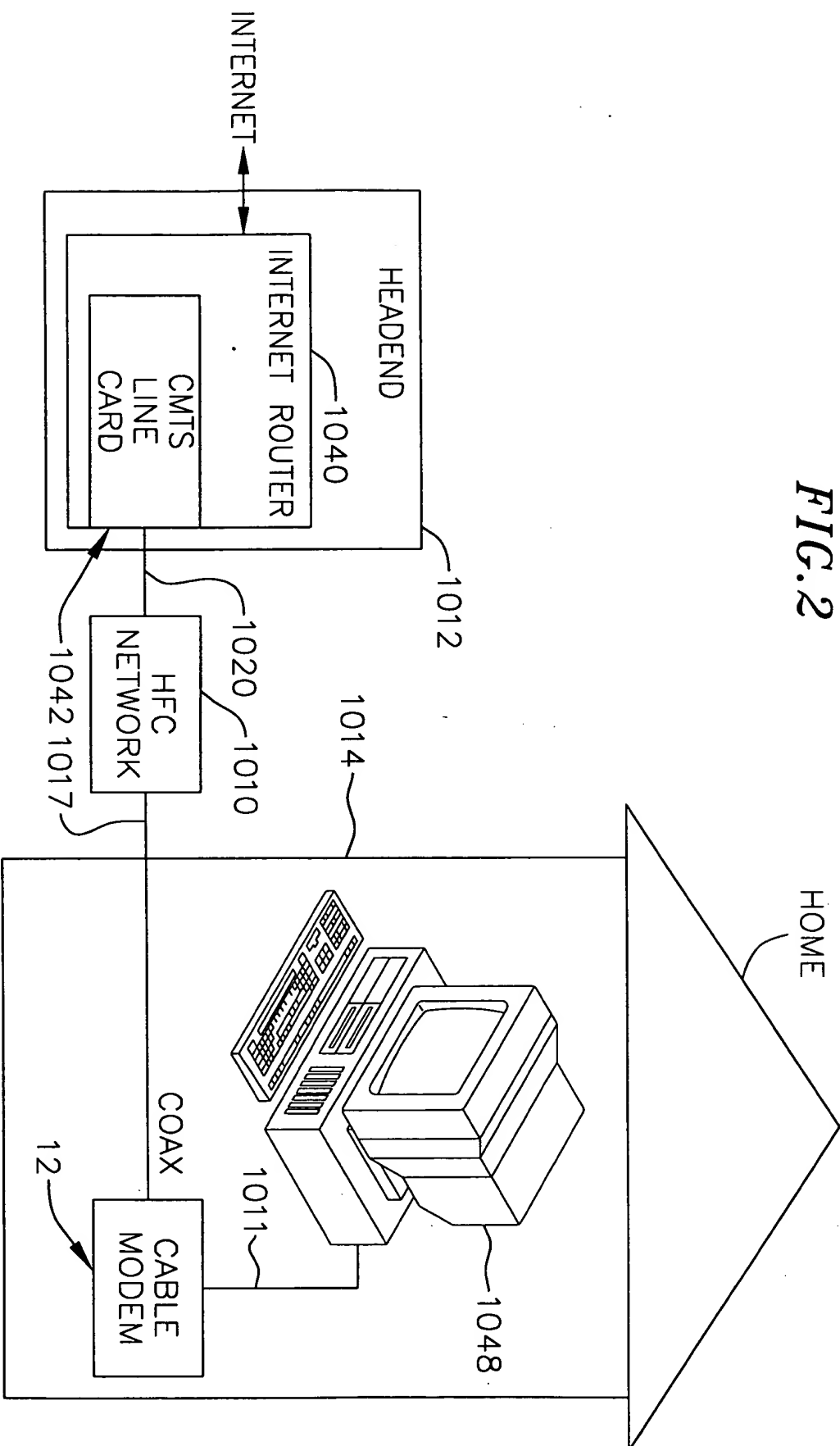


FIG. 3

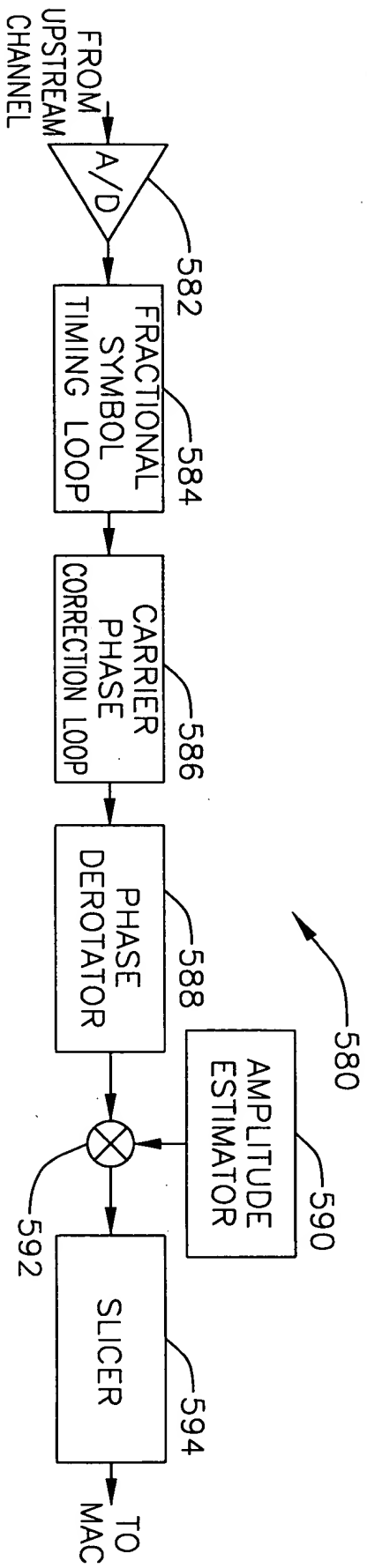


FIG. 4

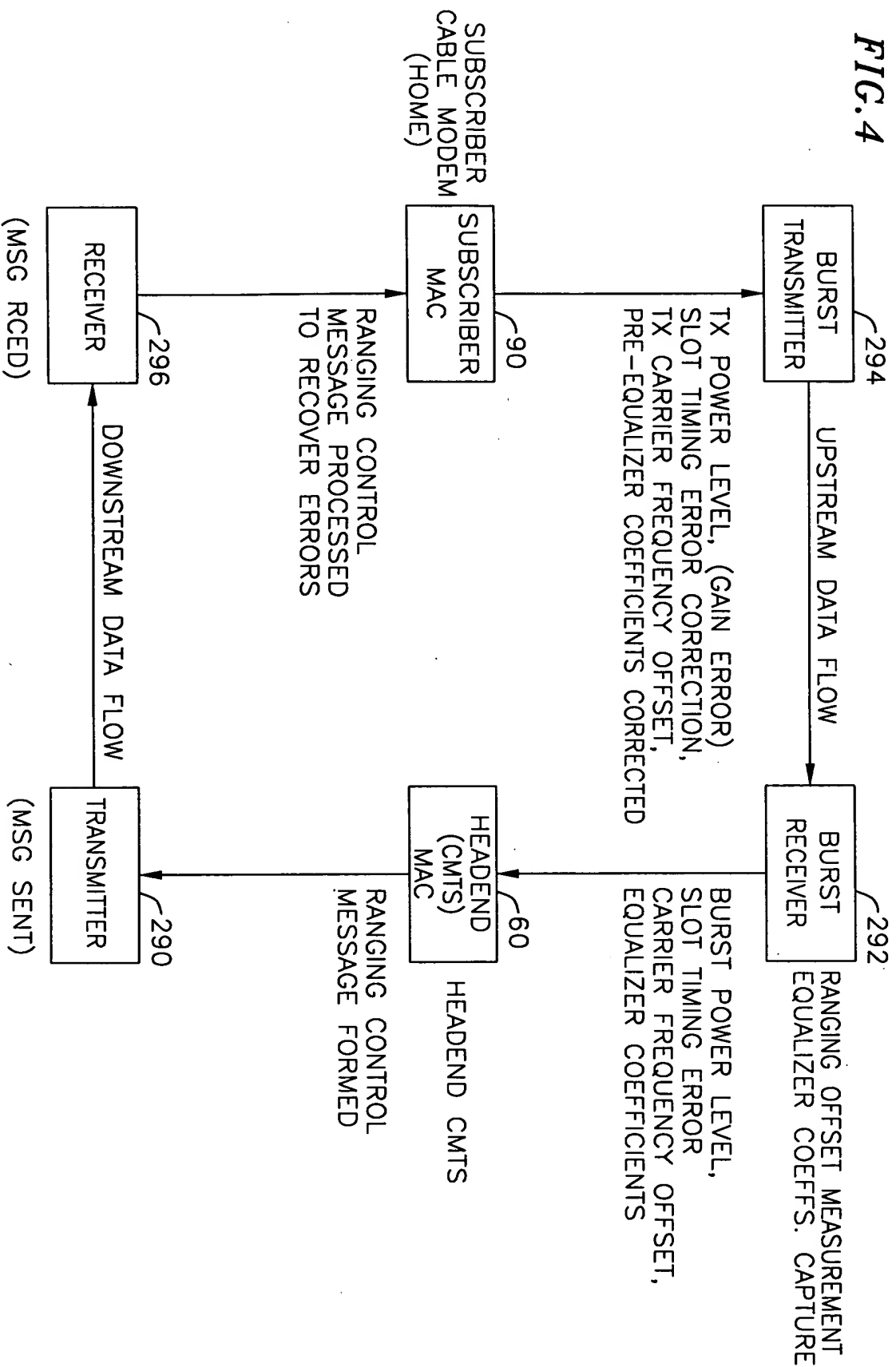


FIG. 5A

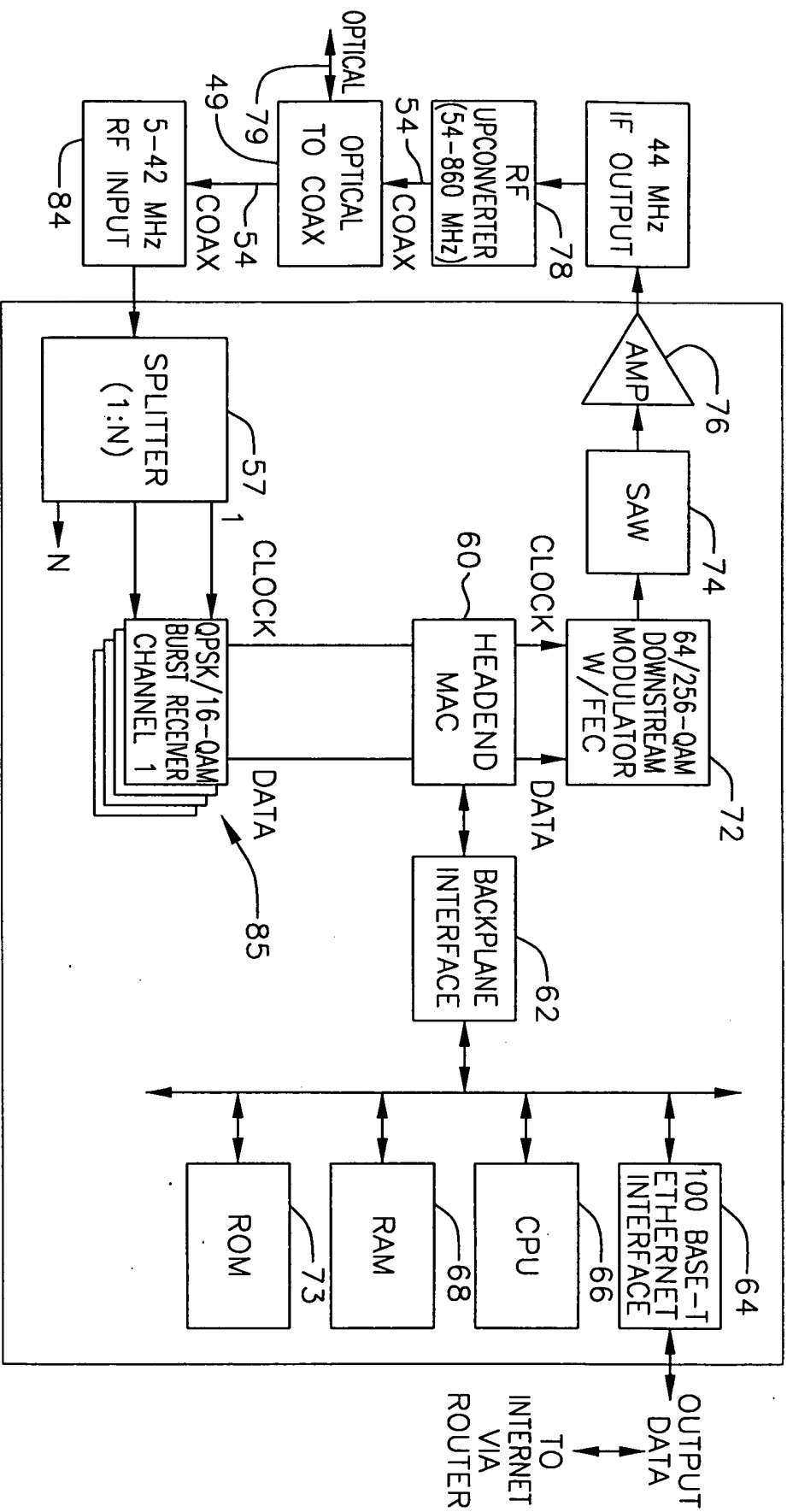


FIG. 5B

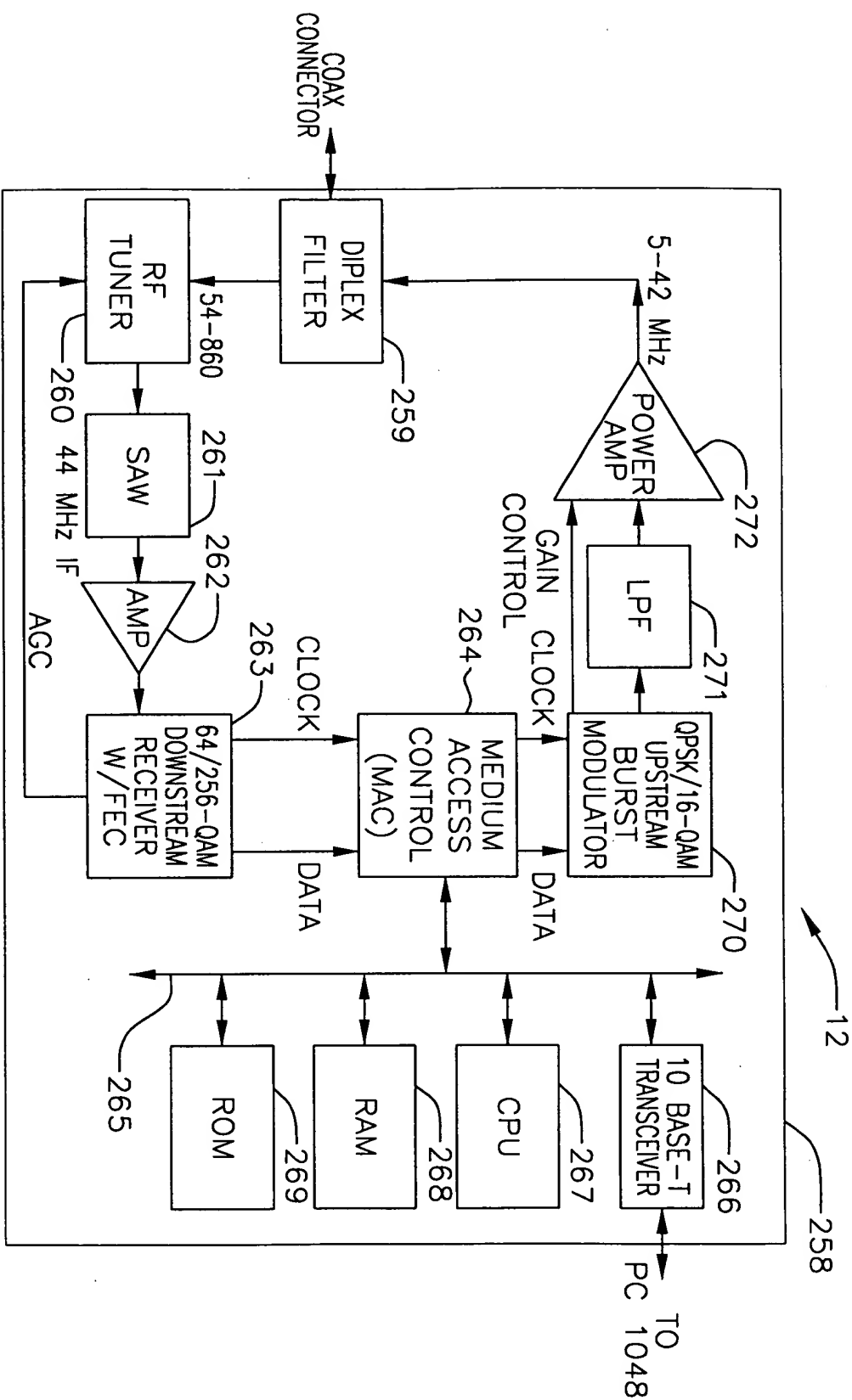


FIG. 6A

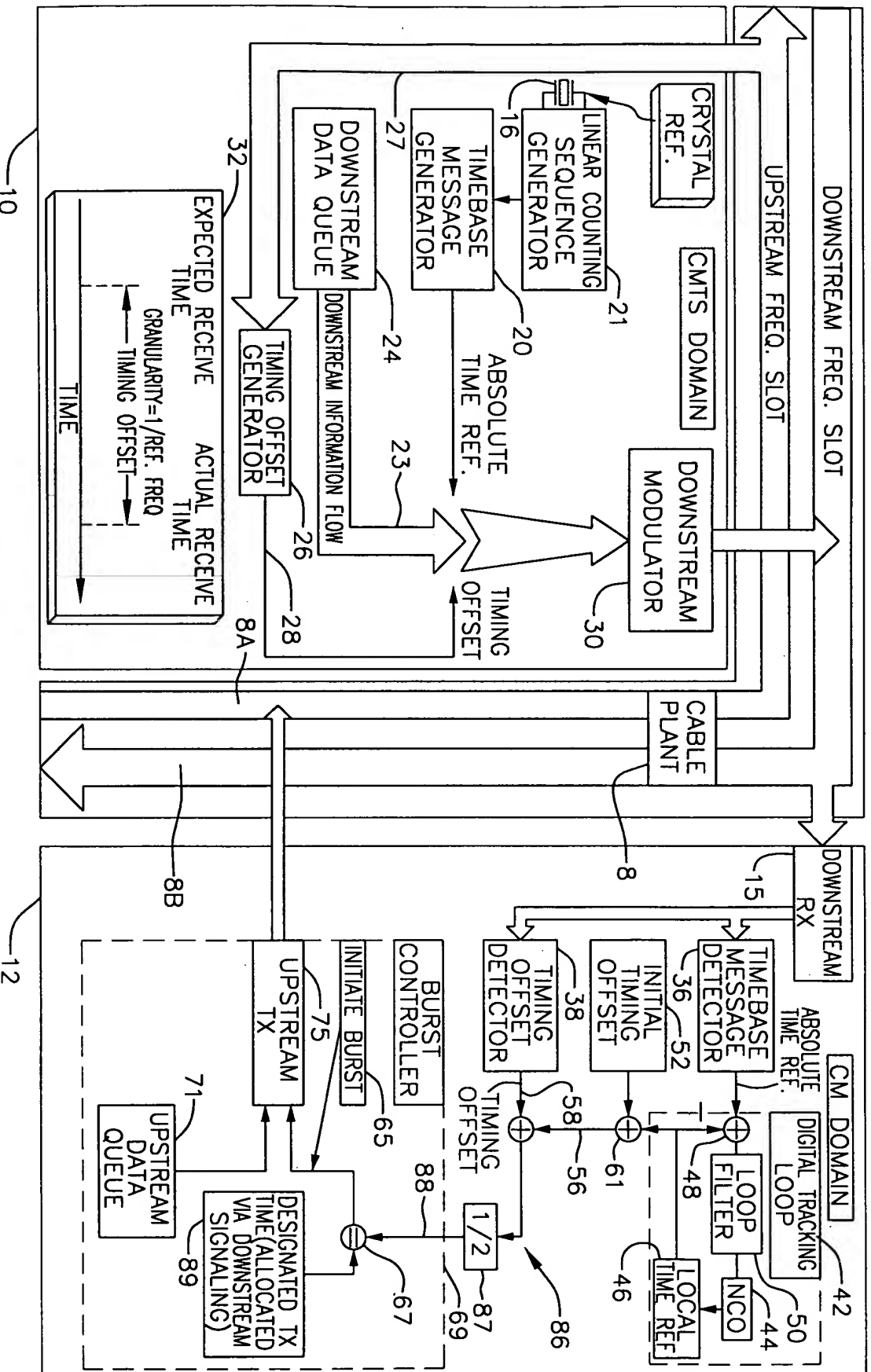


FIG. 6B

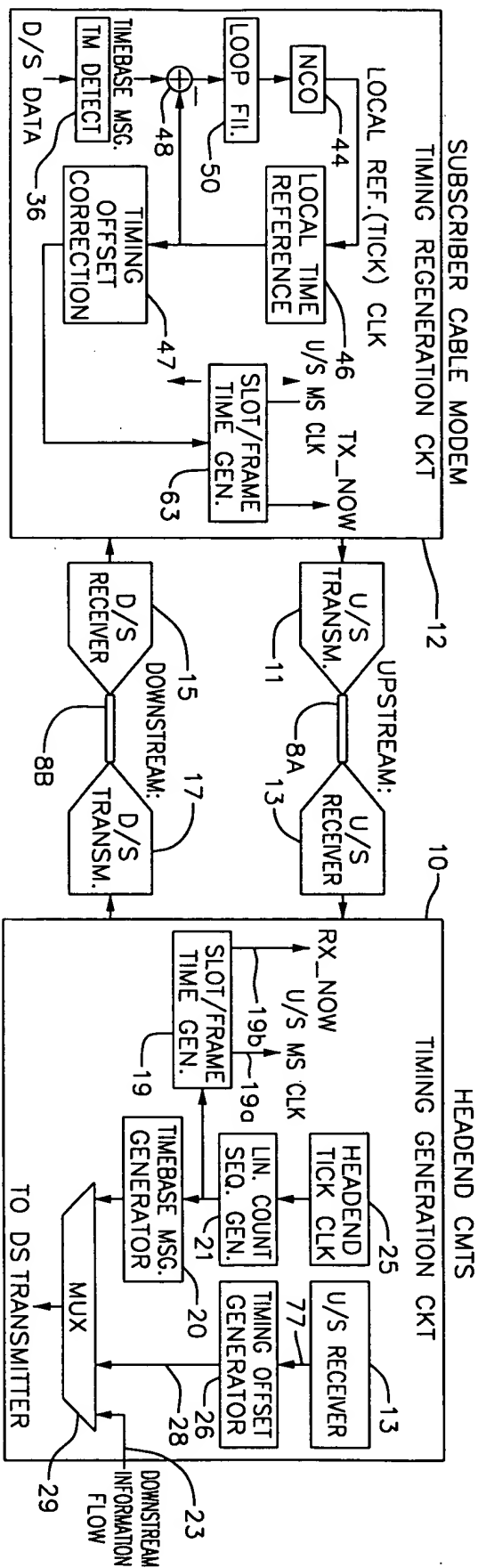
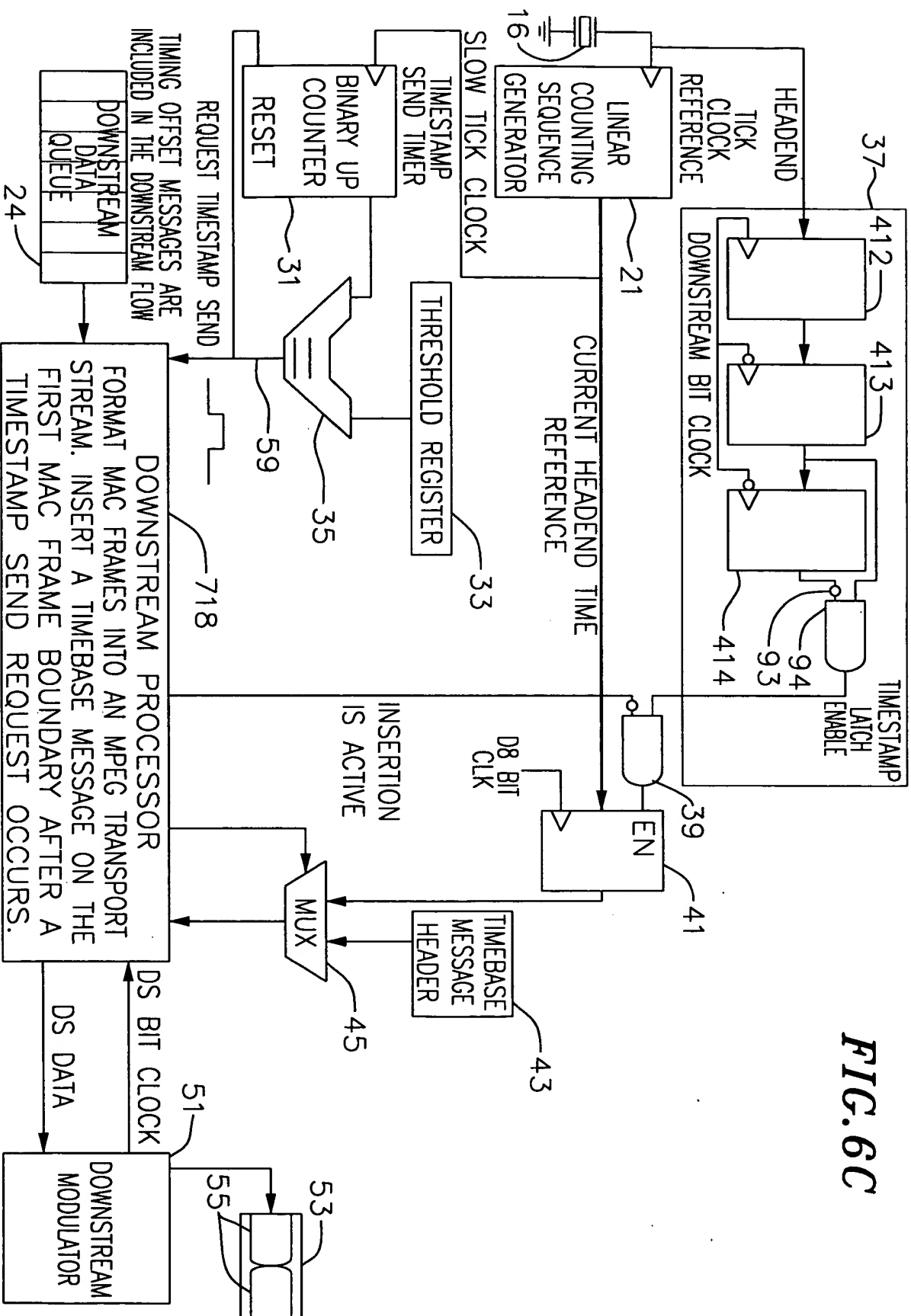
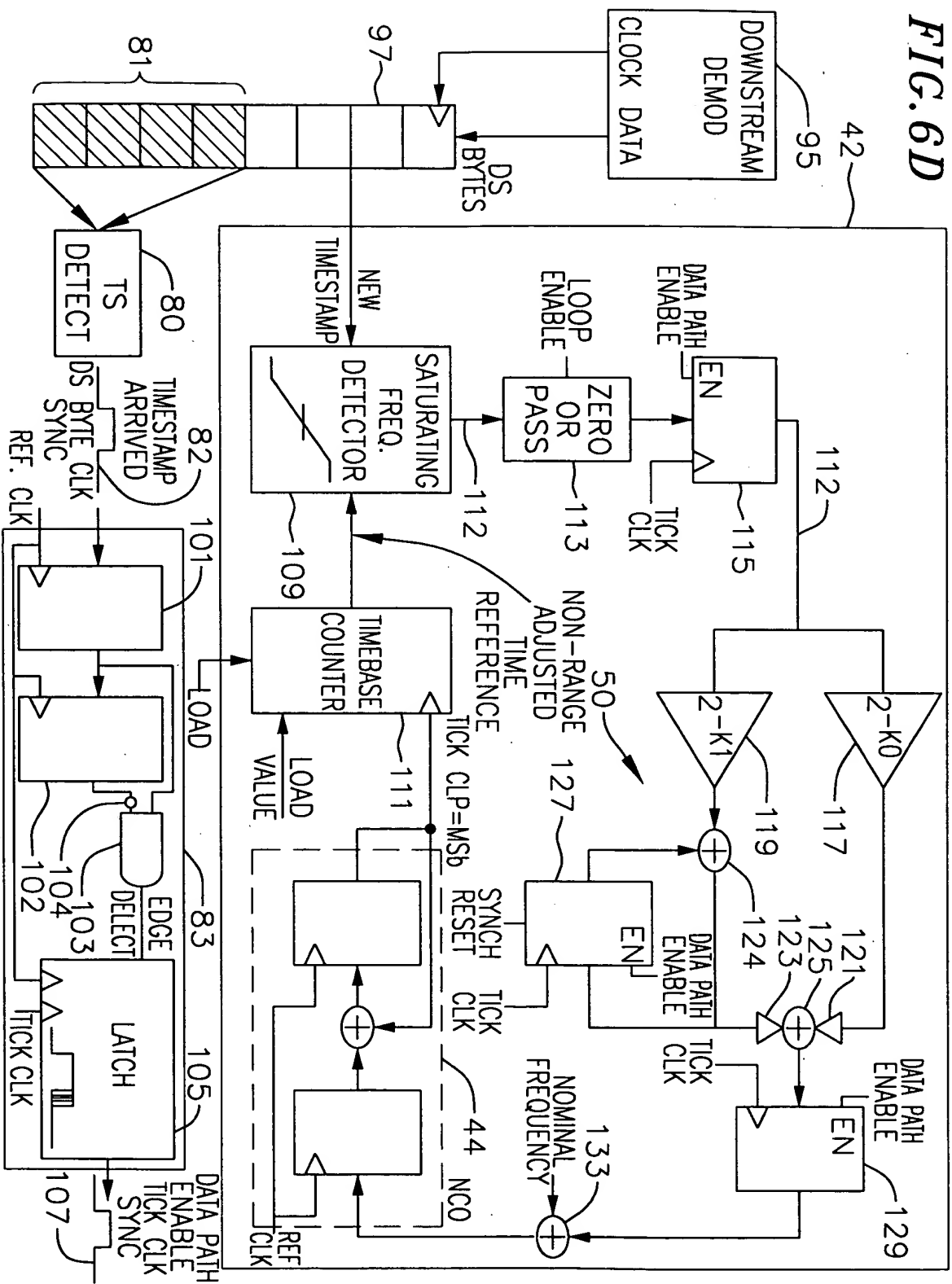


FIG. 6C





UPDATE RATE	COARSE COEFFS	FINE COEFFICIENTS
1kHz(1ms)	$K0=2^{-11}$ $K1=2^{-15}$ (BW=50Hz)	$K0=2^{-16}$ $K1=2^{-25}$ (BW=1Hz)
300Hz(3.3ms)	$K0=2^{-12}$ $K1=2^{-15}$ (BW=20Hz)	$K0=2^{-16}$ $K1=2^{-23}$ (BW=1Hz)
100Hz(10ms)	$K0=2^{-13}$ $K1=2^{-16}$ (BW=10Hz)	$K0=2^{-16}$ $K1=2^{-22}$ (BW=1Hz)
50Hz(20ms)	$K0=2^{-14}$ $K1=2^{-17}$ (BW=5Hz)	$K0=2^{-16}$ $K1=2^{-21}$ (BW=1Hz)
30Hz(33ms)	$K0=2^{-15}$ $K1=2^{-18}$ (BW=3Hz)	$K0=2^{-17}$ $K1=2^{-21}$ (BW=1Hz)
10Hz(100ms)	$K0=2^{-17}$ $K1=2^{-20}$ (BW=1Hz)	$K0=2^{-17}$ $K1=2^{-20}$ (BW=1Hz)
5Hz(200ms)	$K0=2^{-18}$ $K1=2^{-20}$ (BW=1Hz)	$K0=2^{-18}$ $K1=2^{-20}$ (BW=1Hz)

FIG.6E

FIG. 7A

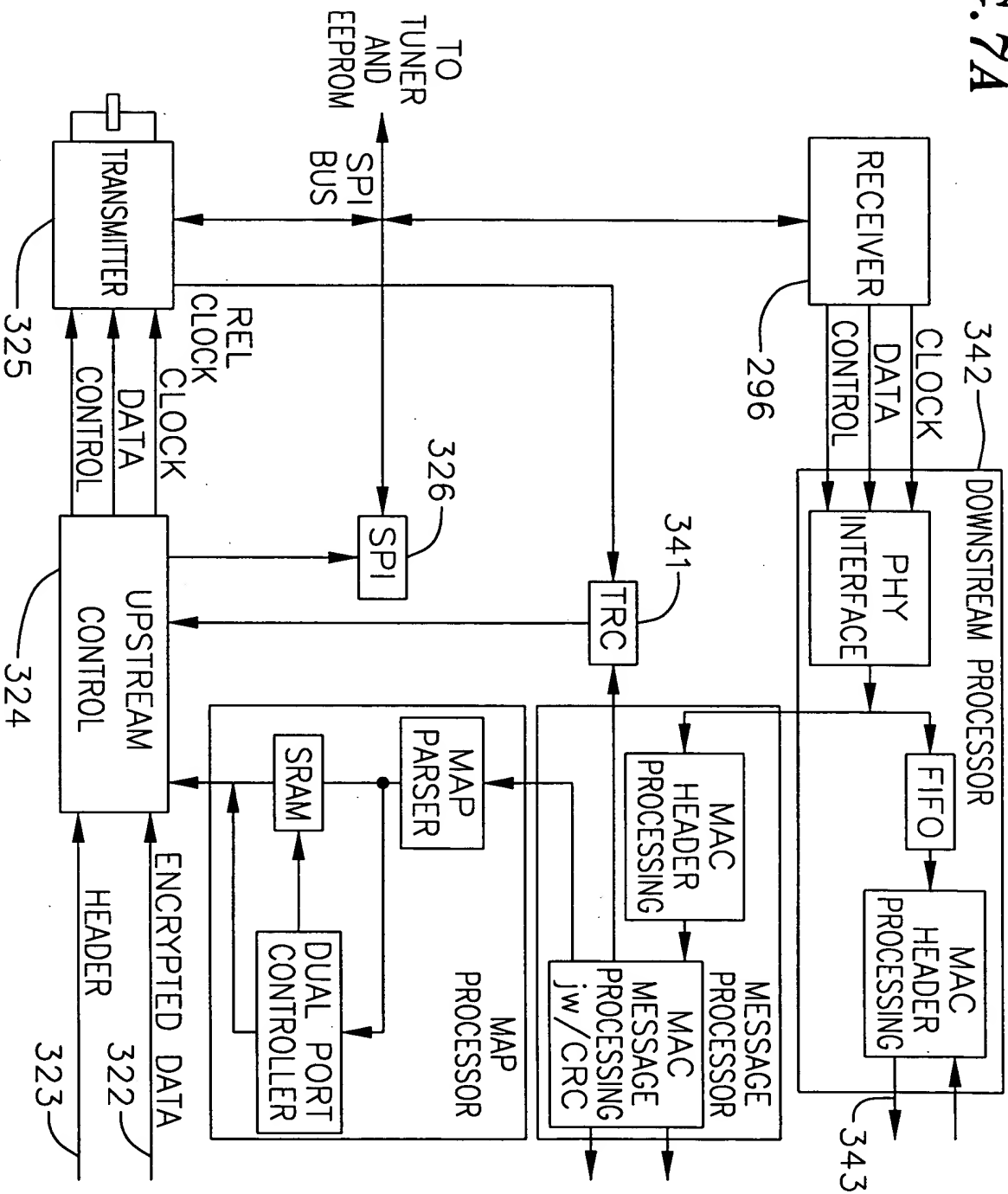


FIG. 7B

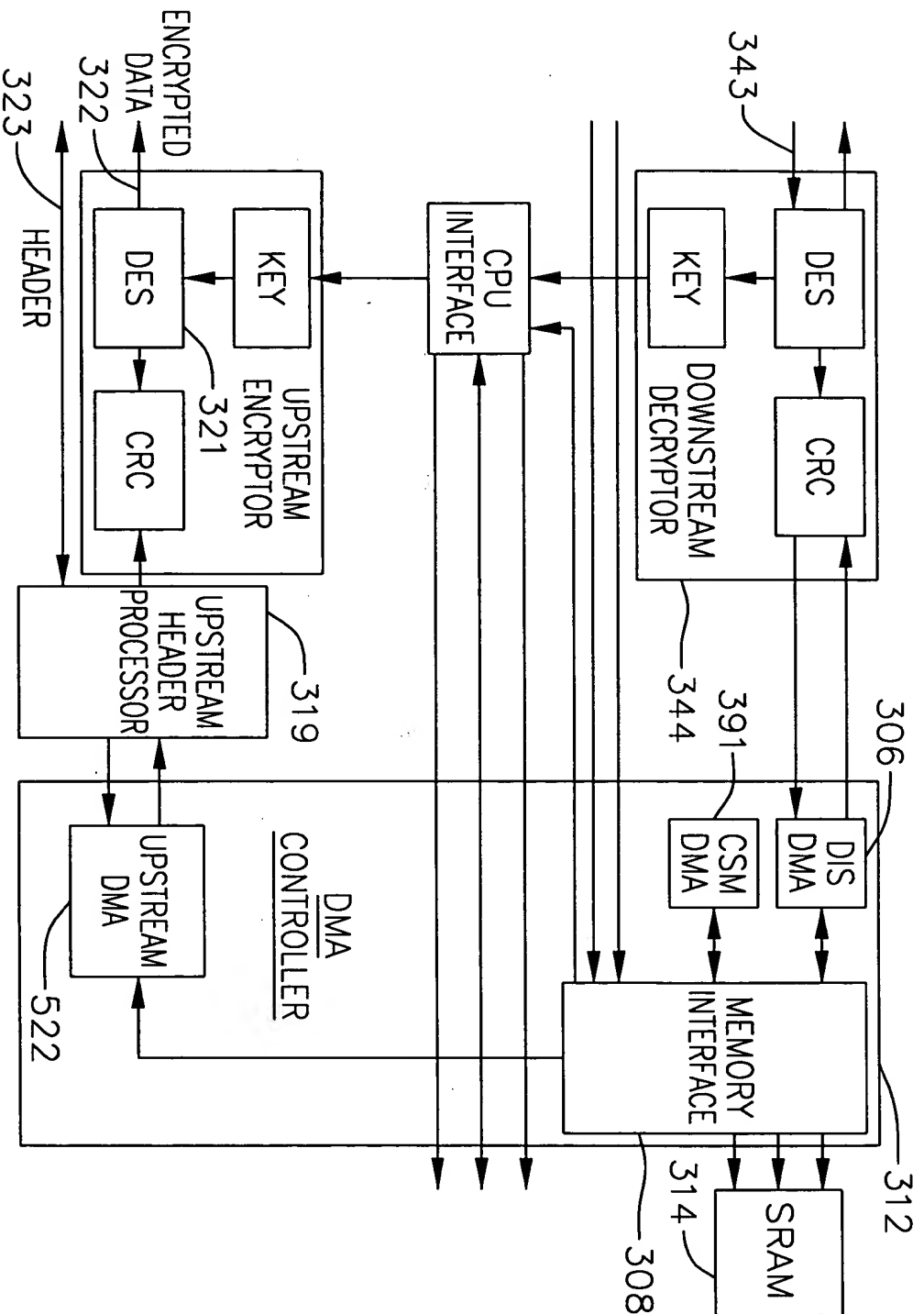
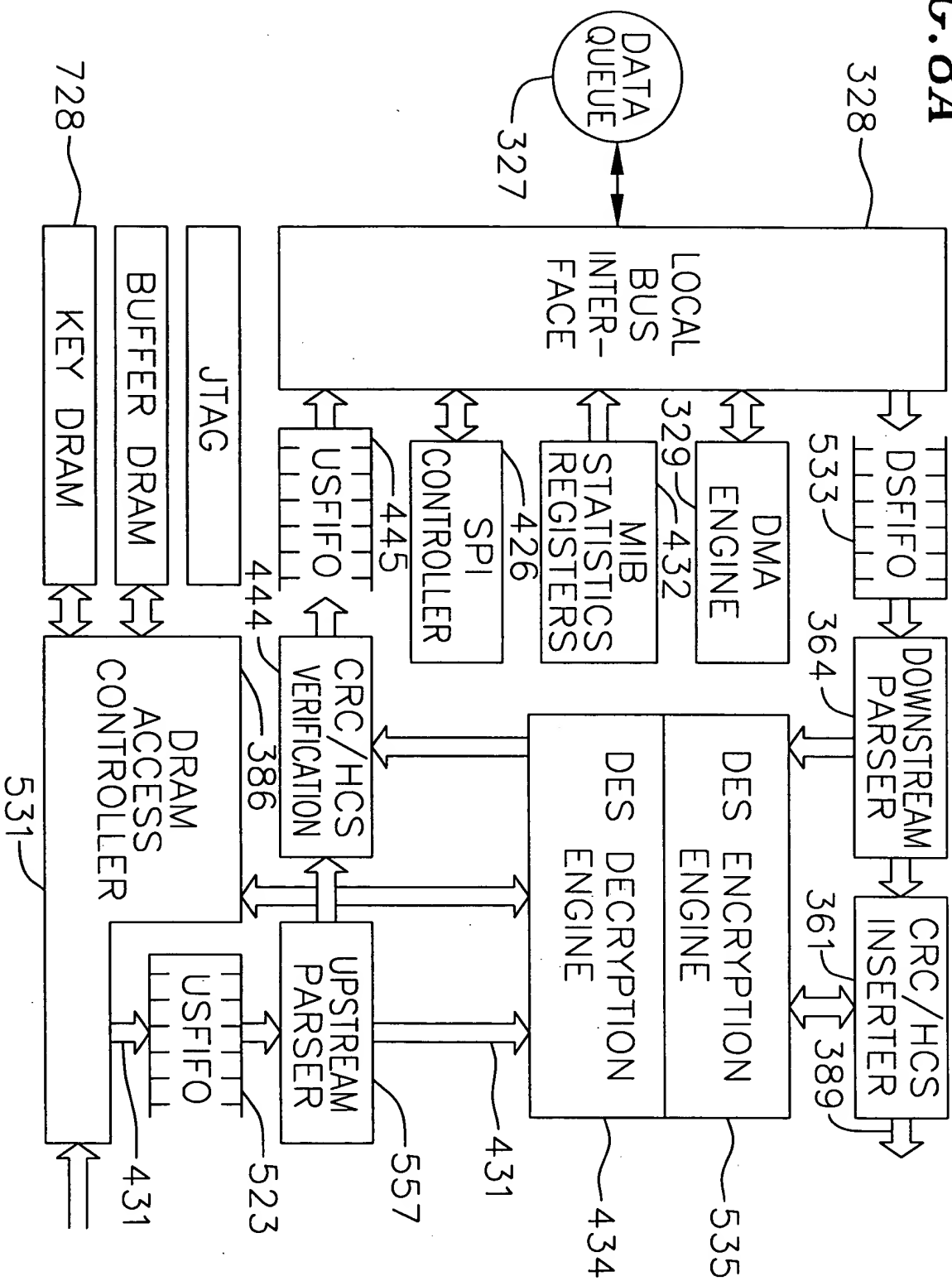


FIG. 8A



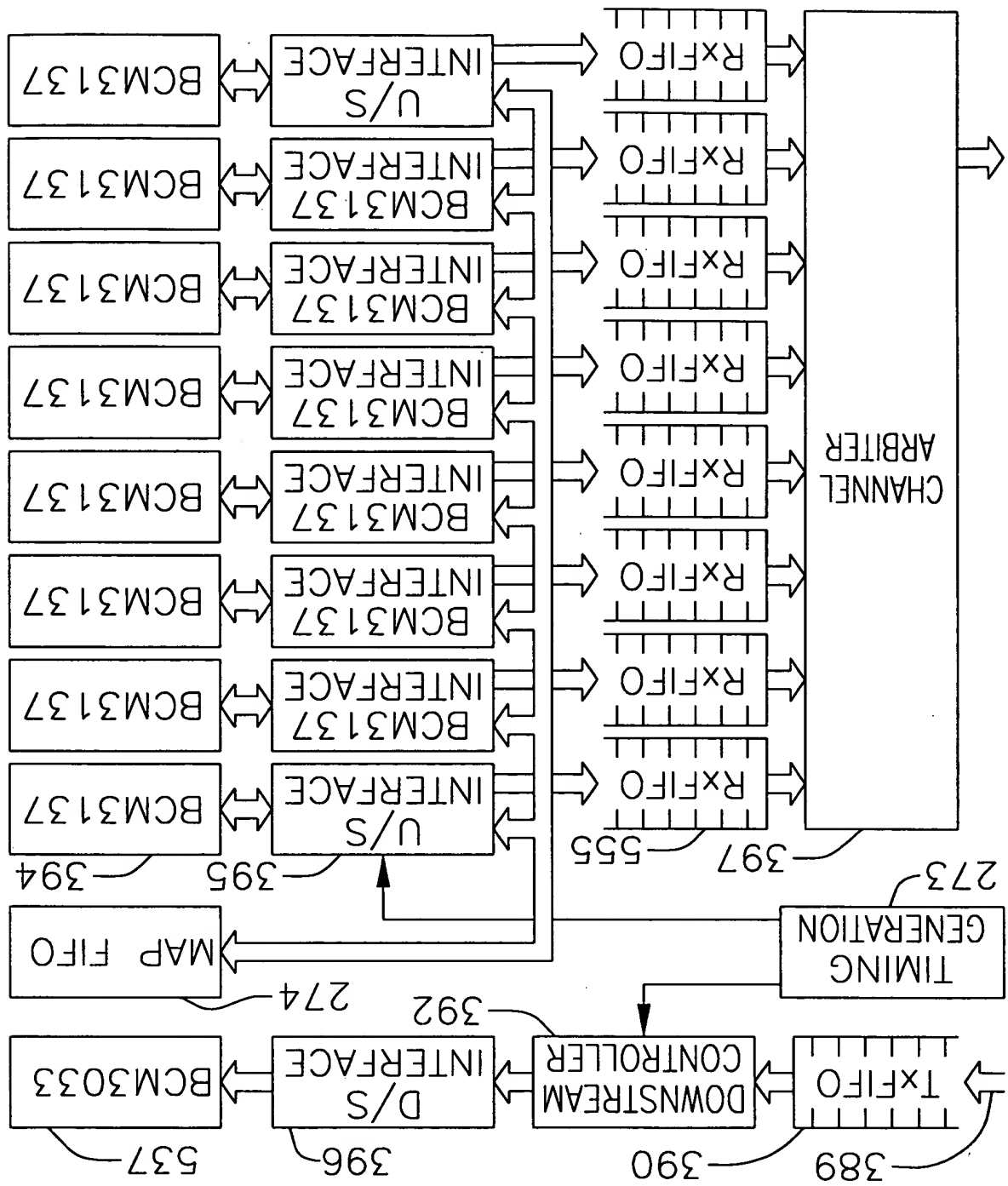


FIG. 8B

FIG. 9

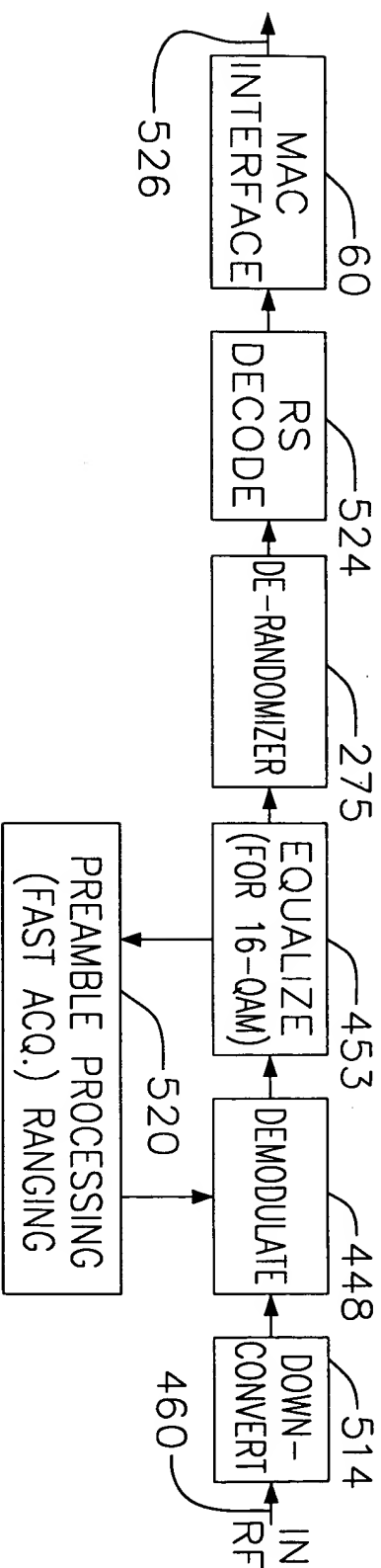
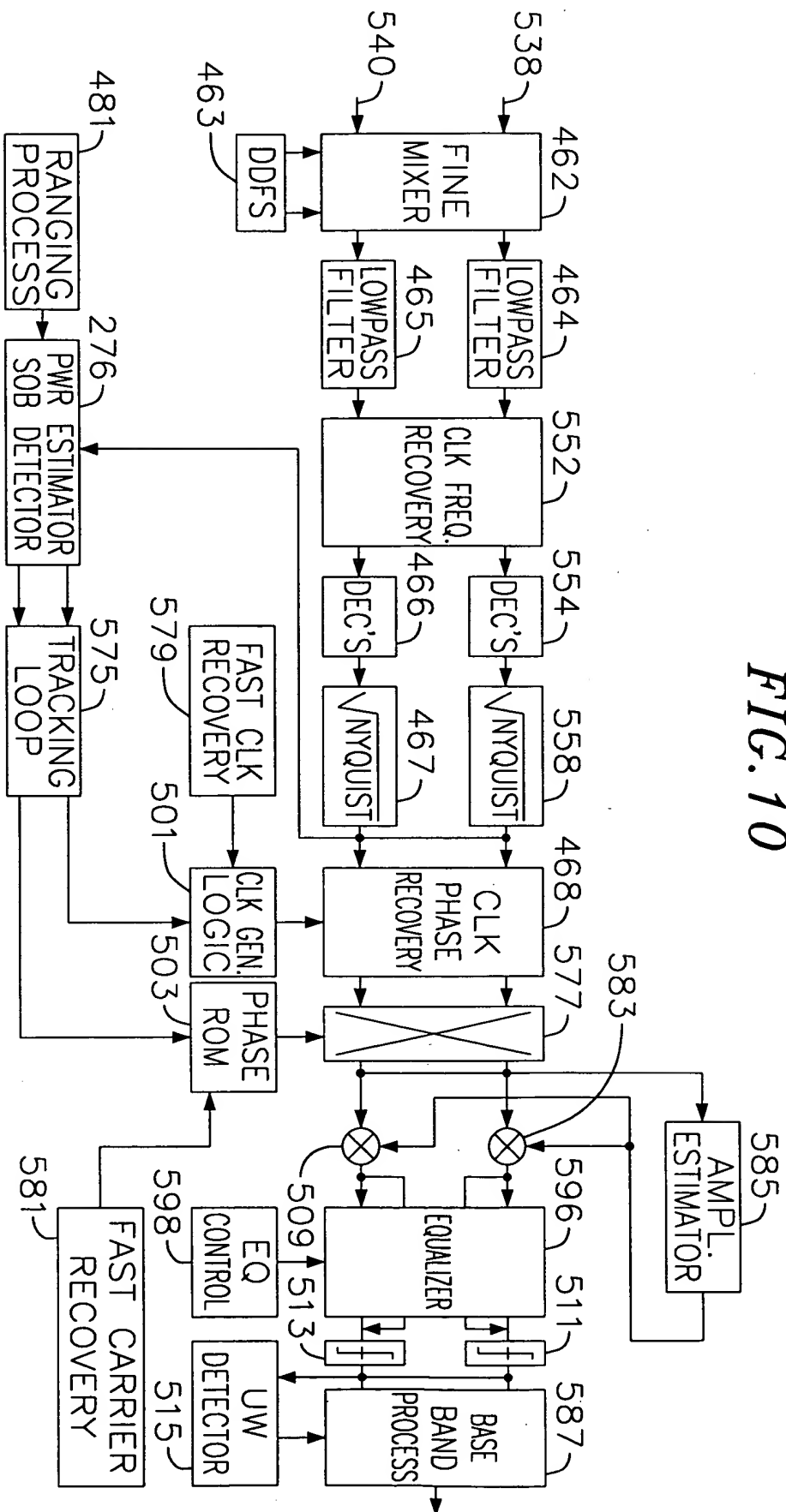


FIG. 10



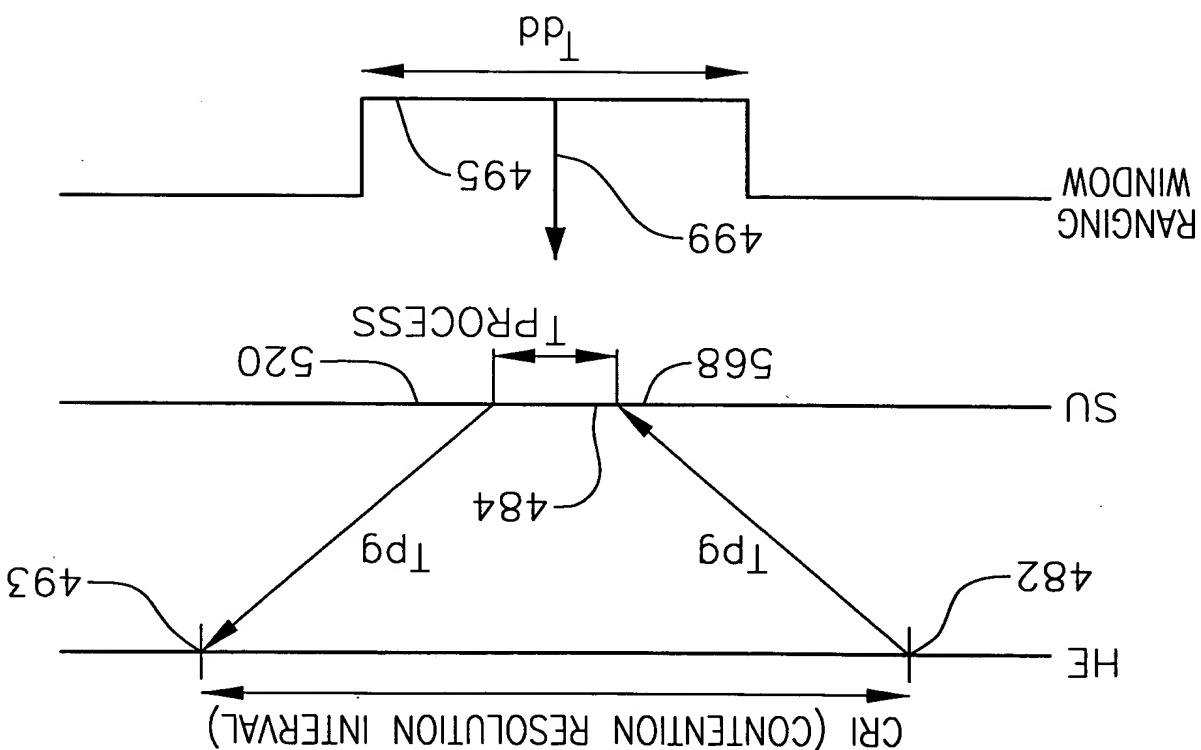
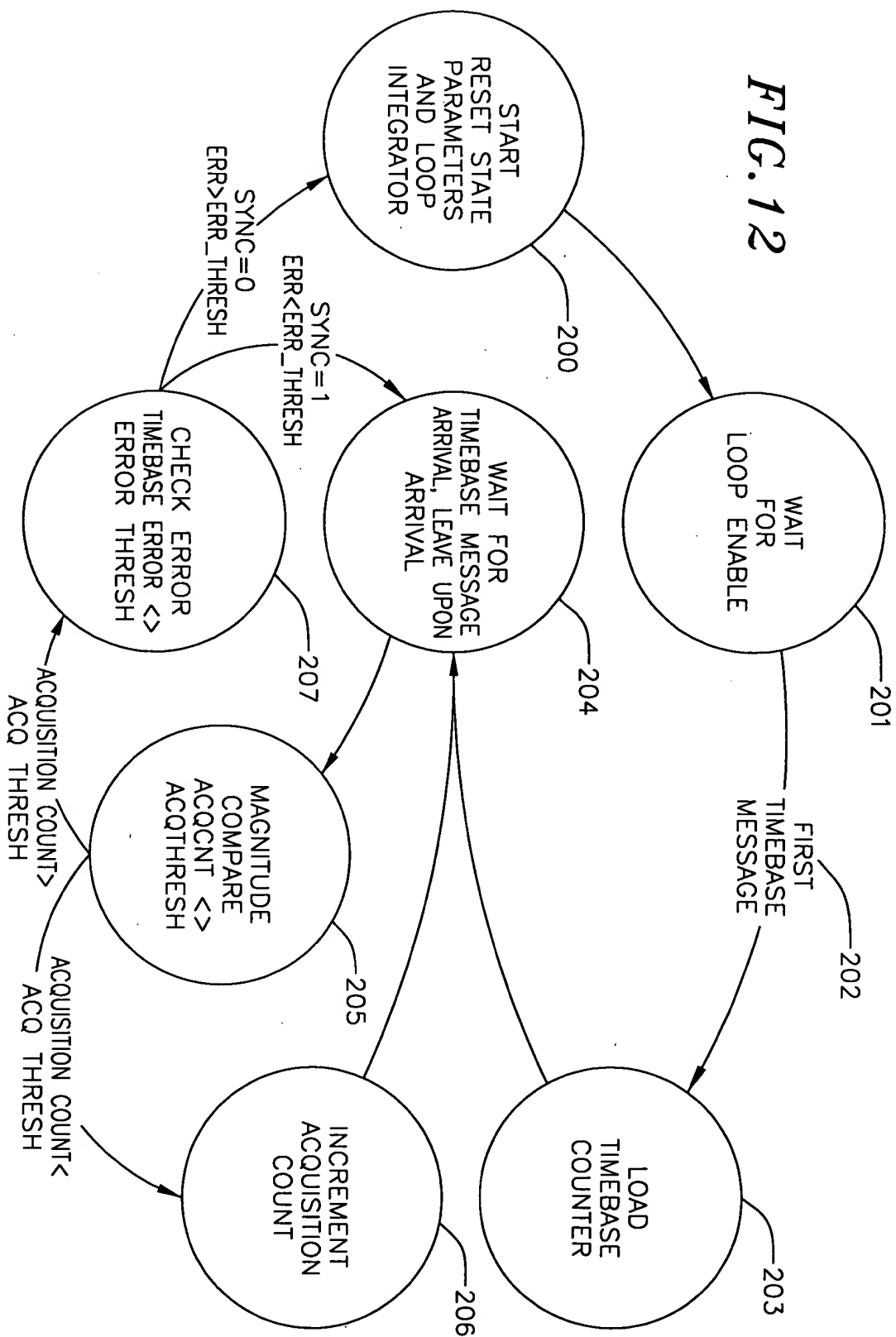


FIG. 11

FIG. 12



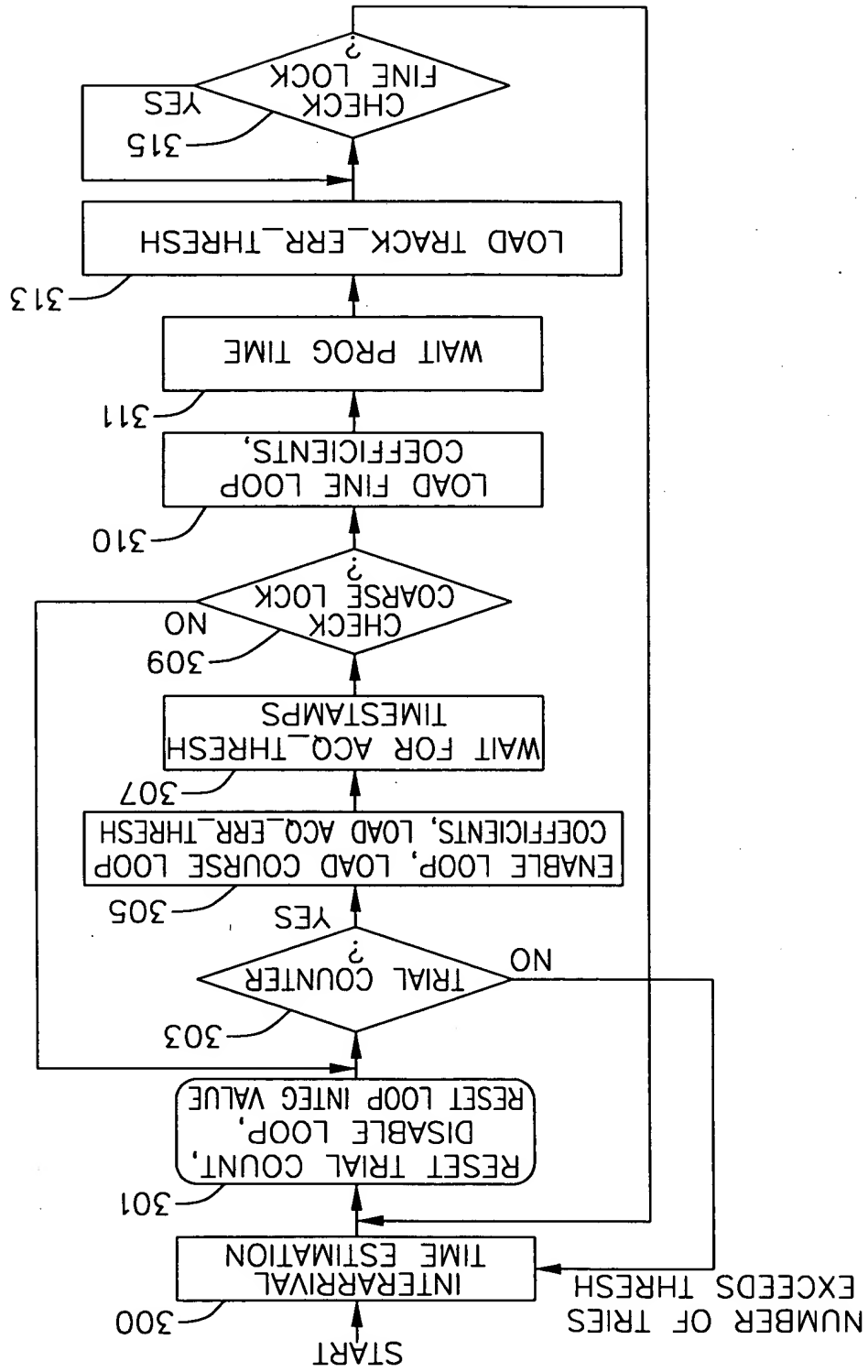
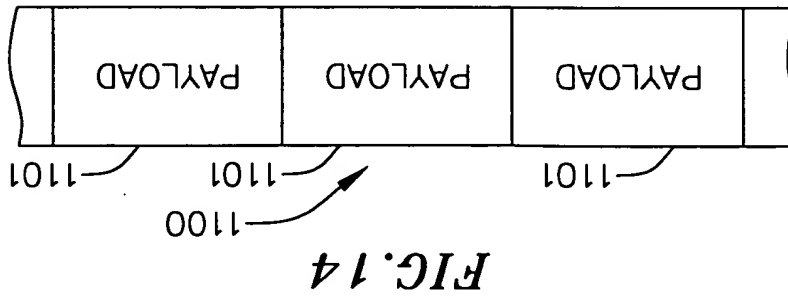
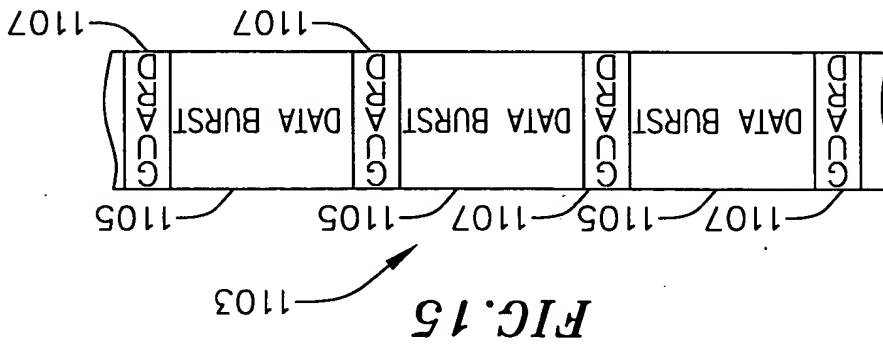
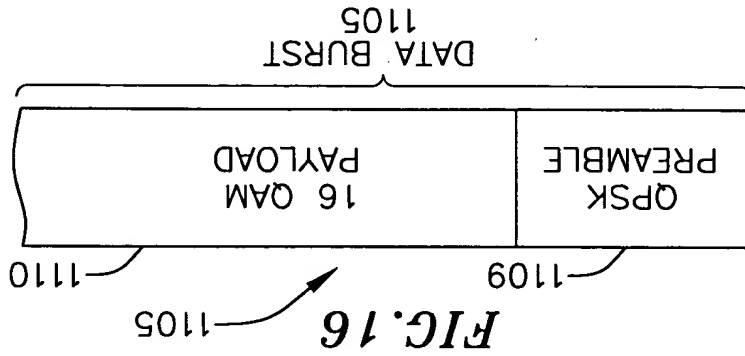
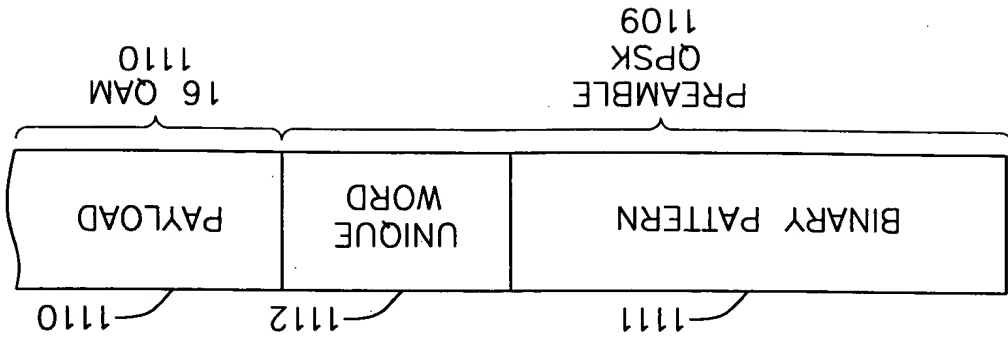


FIG. 13



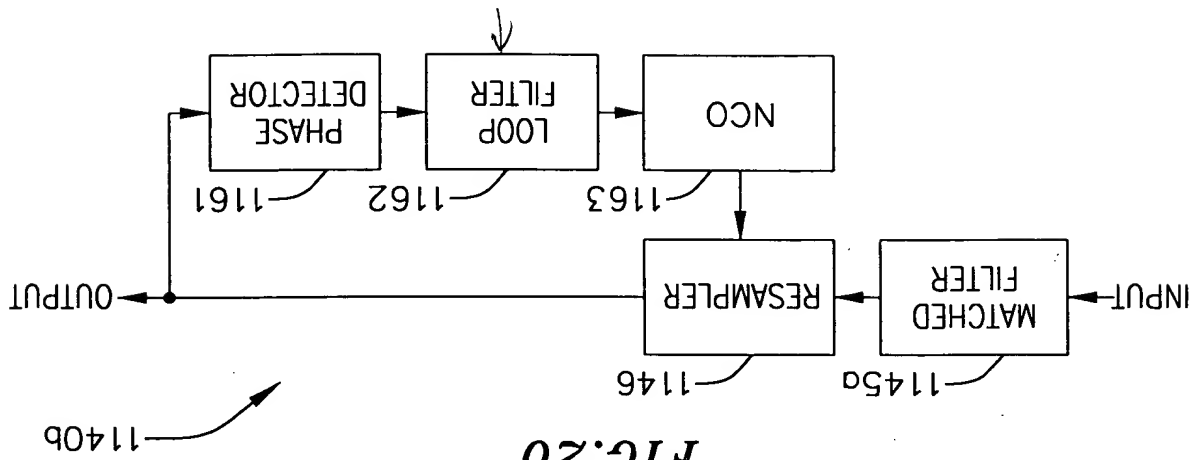


FIG. 20

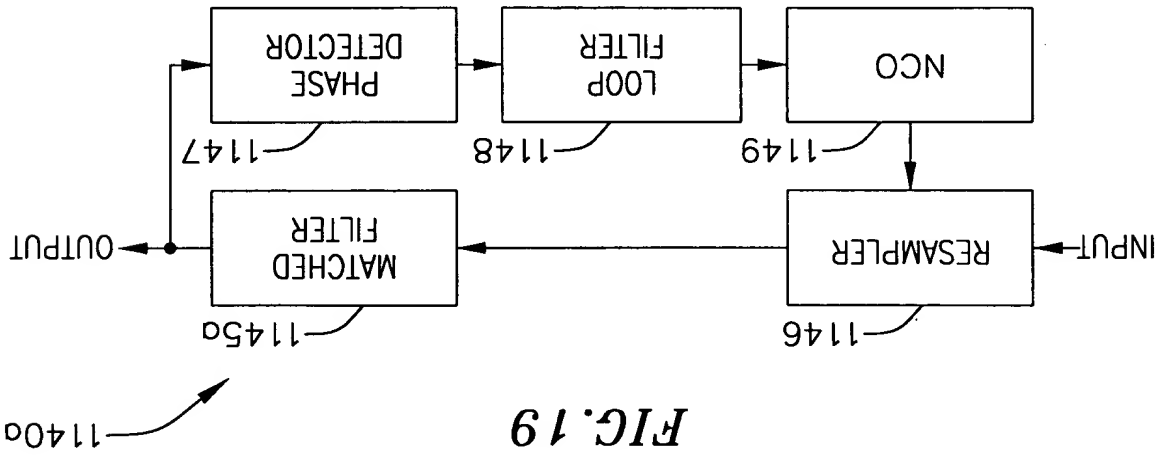


FIG. 19

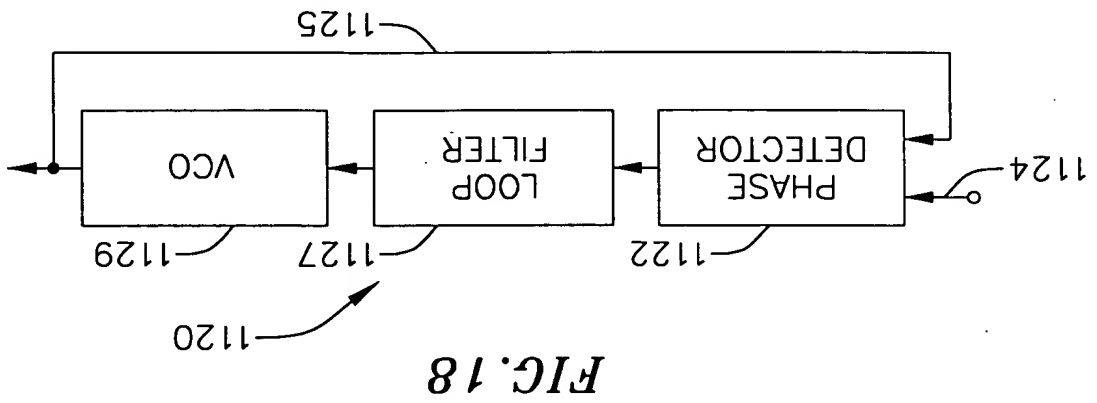
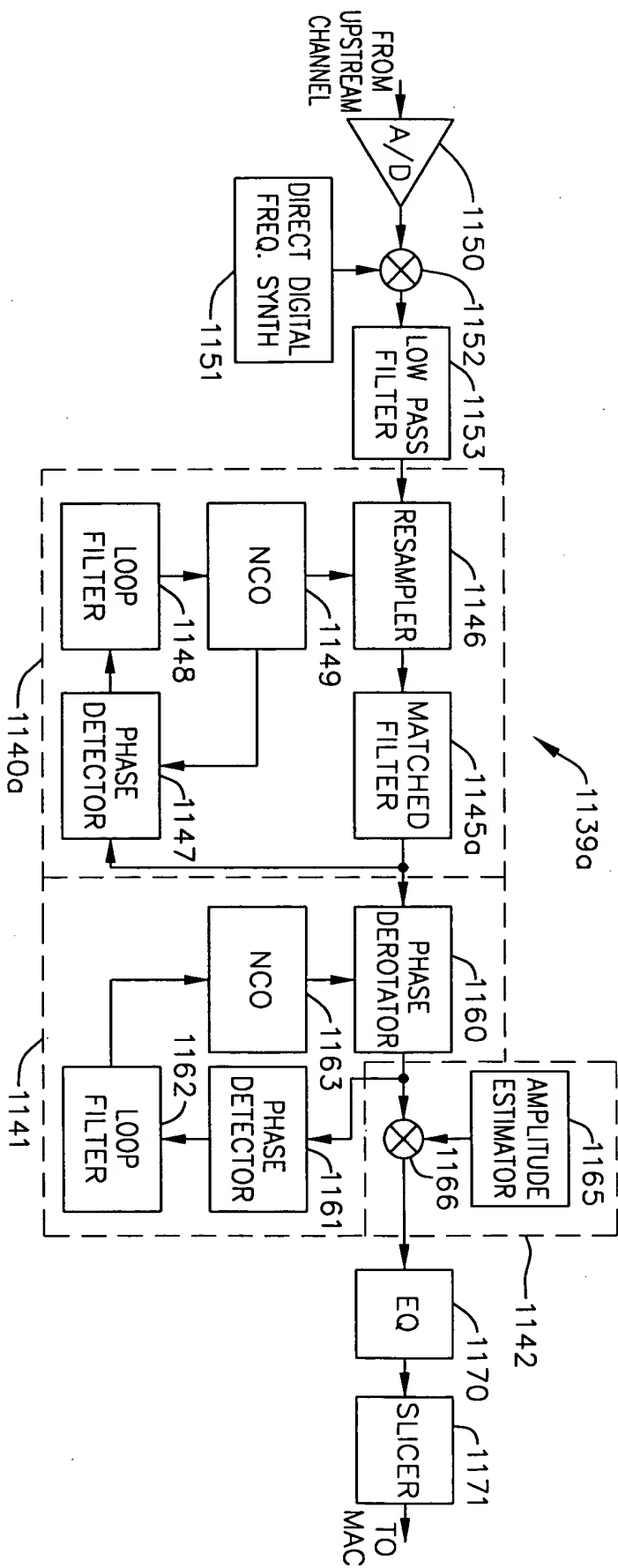
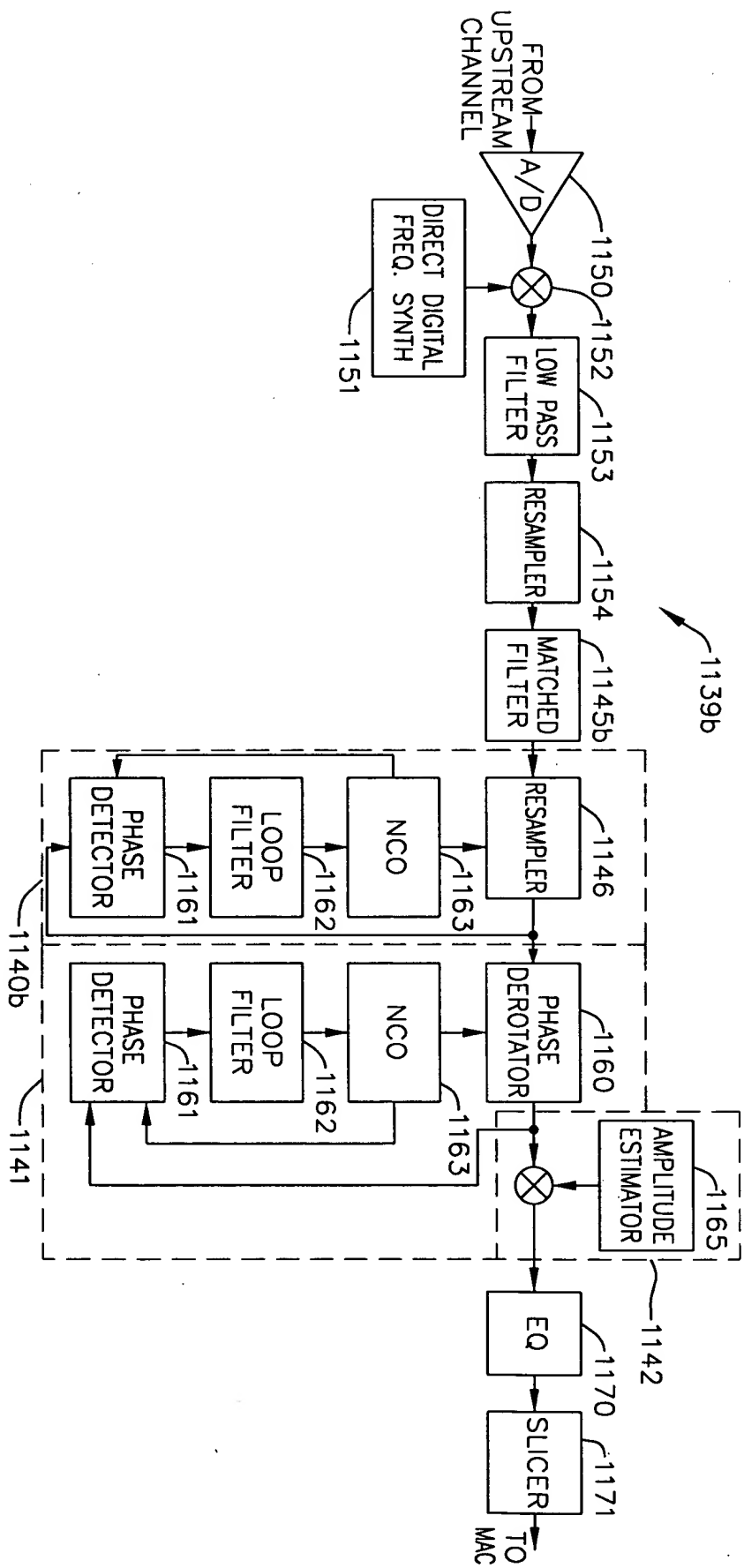


FIG. 18

FIG. 21





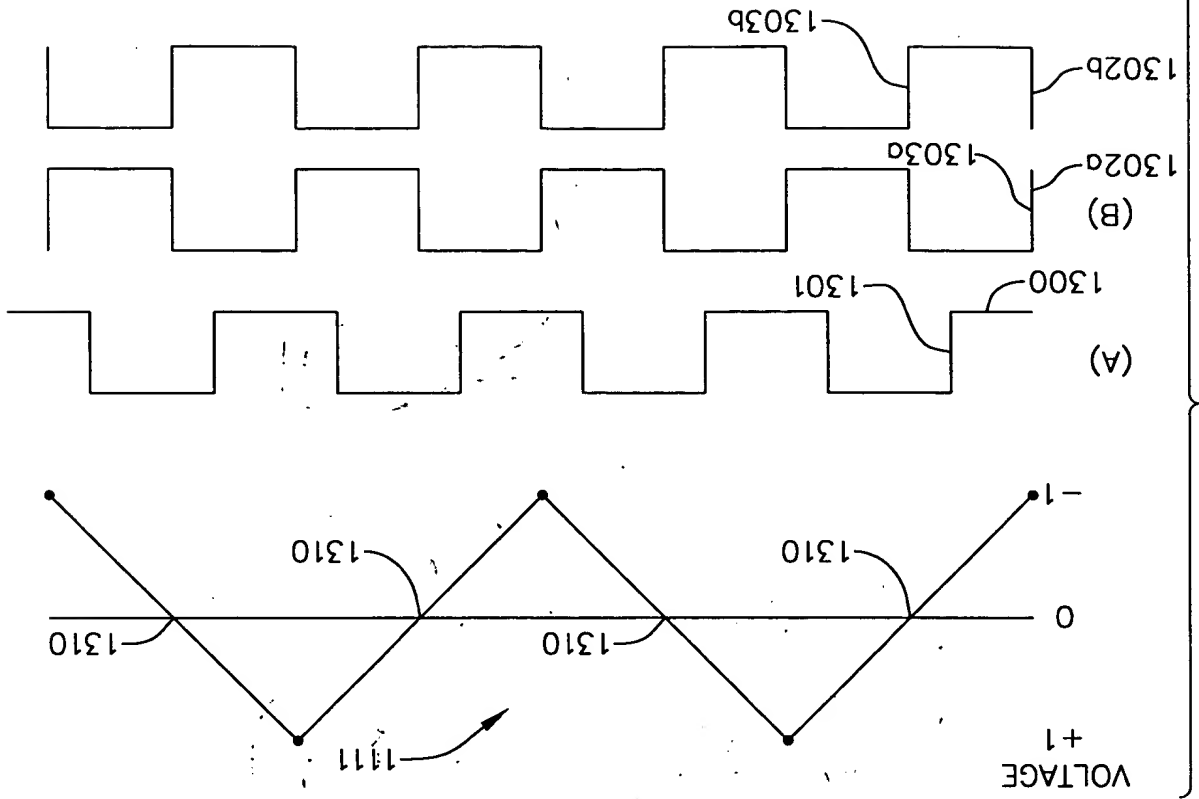


FIG. 24

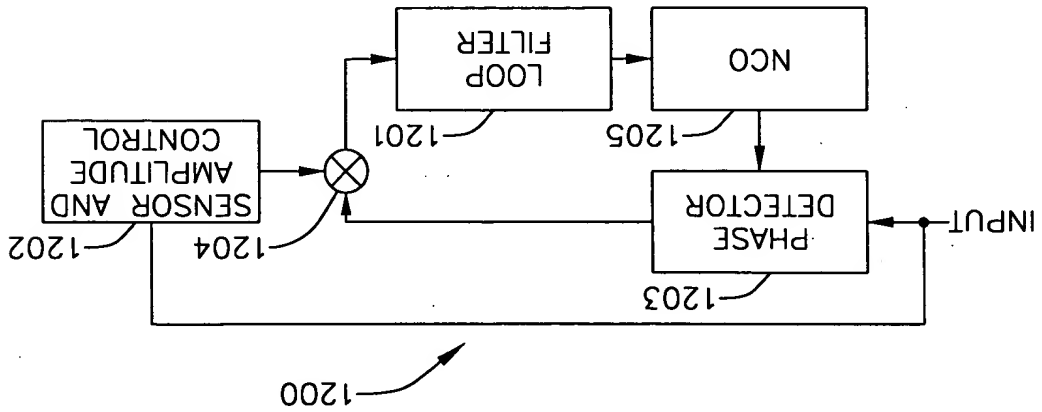


FIG. 23

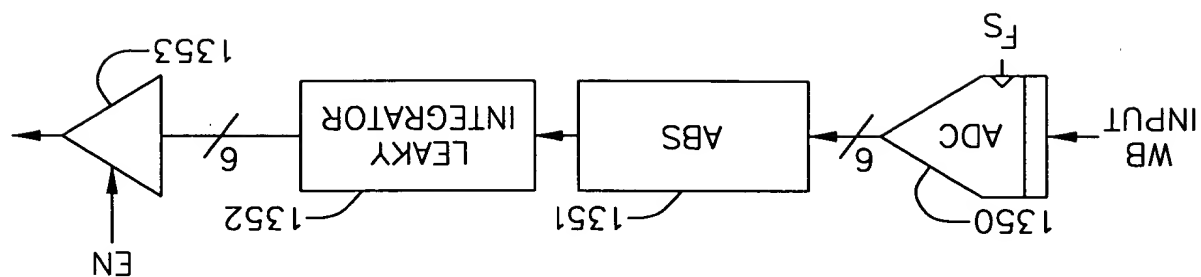
[illegible]

FIG. 25B

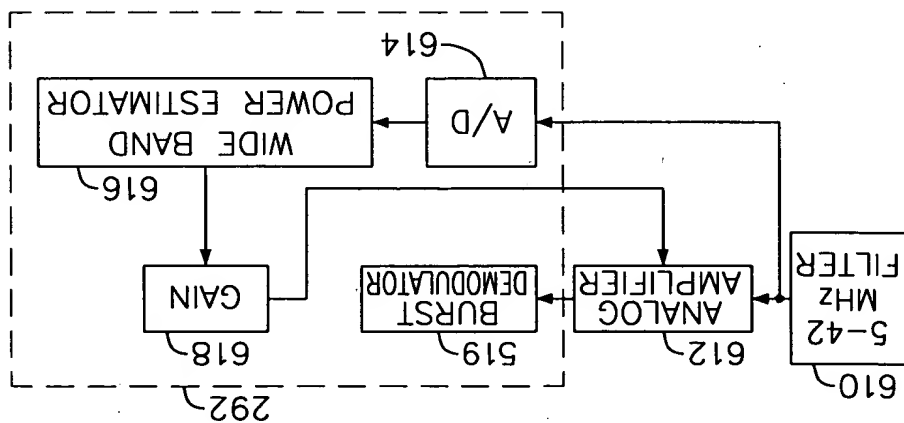


FIG. 25A

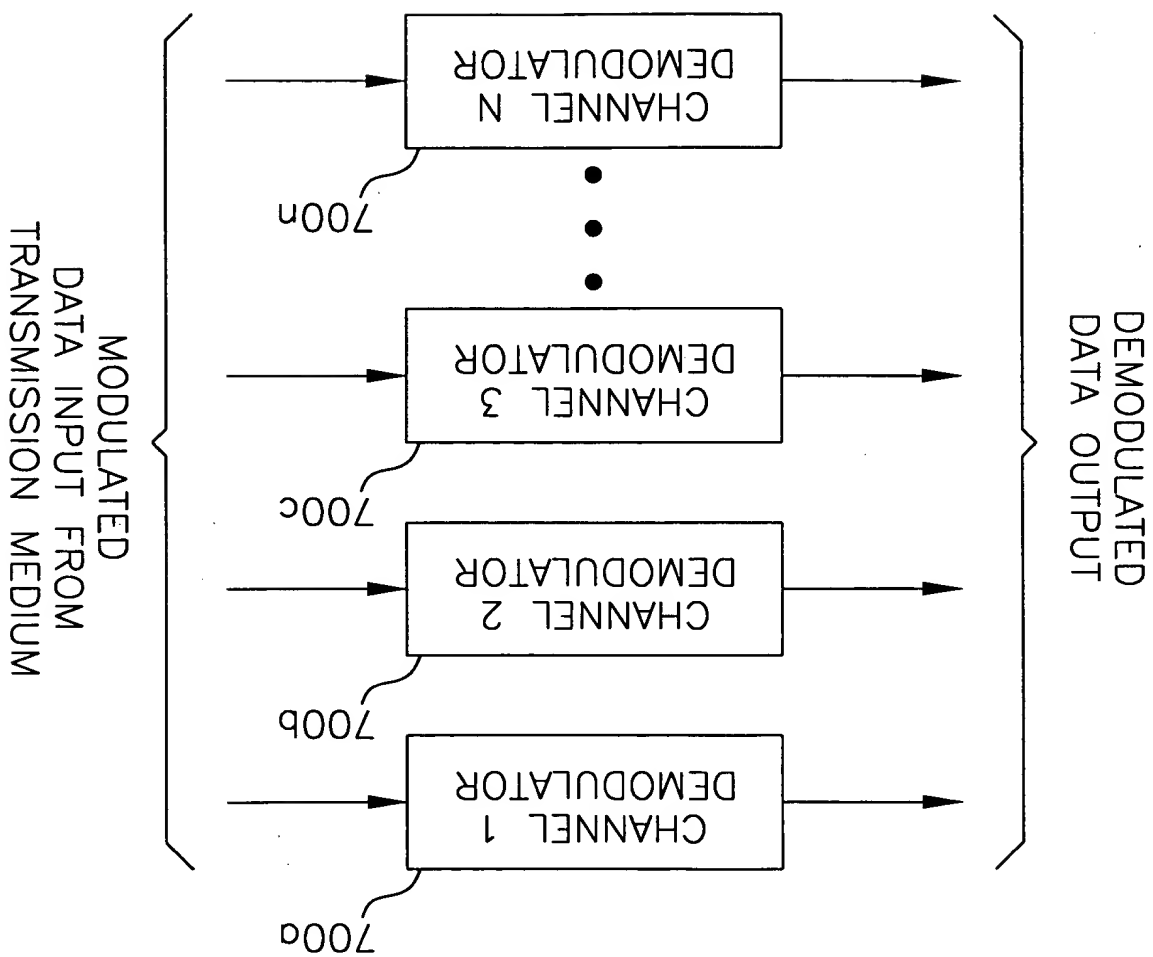
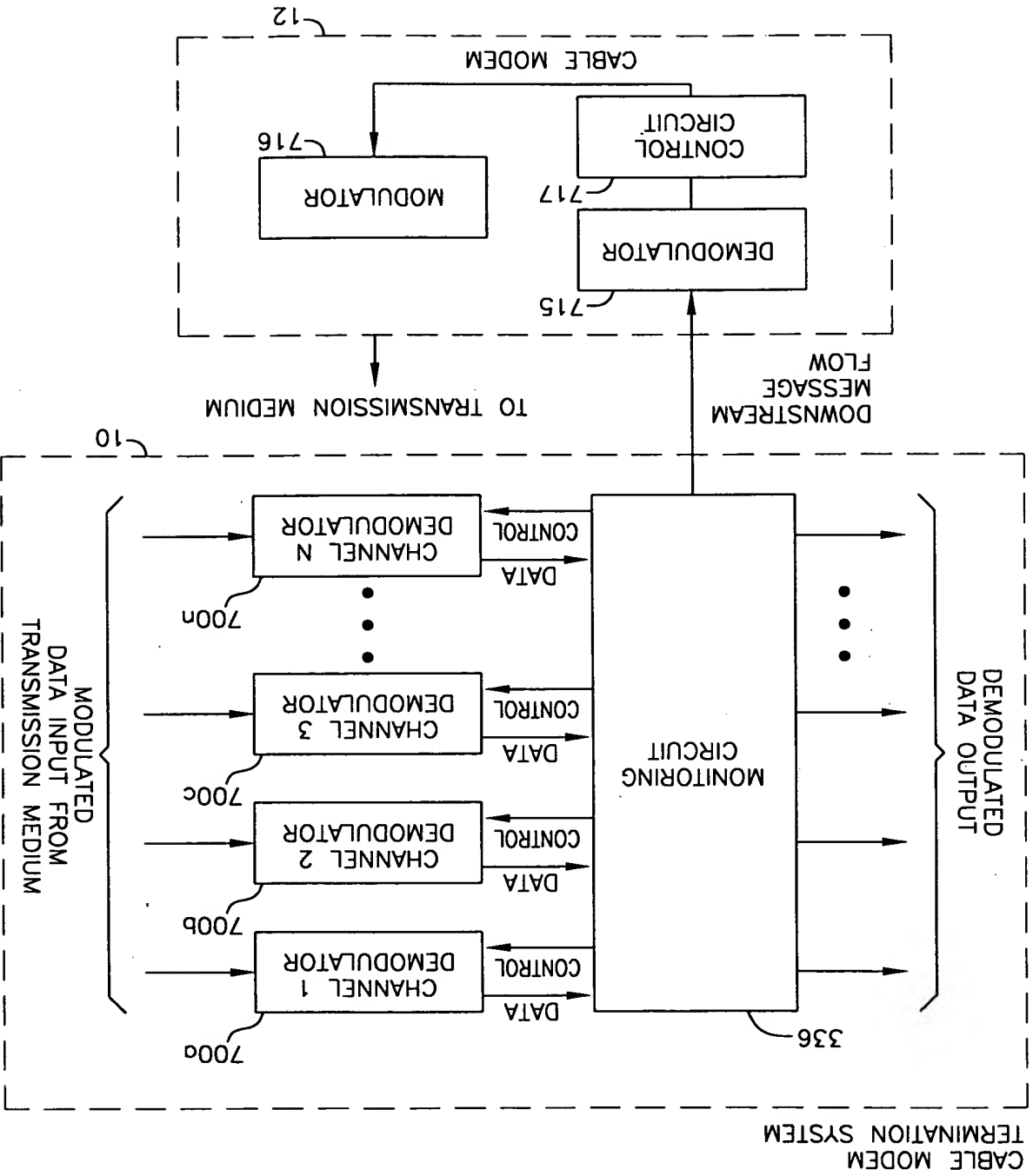


FIG. 26



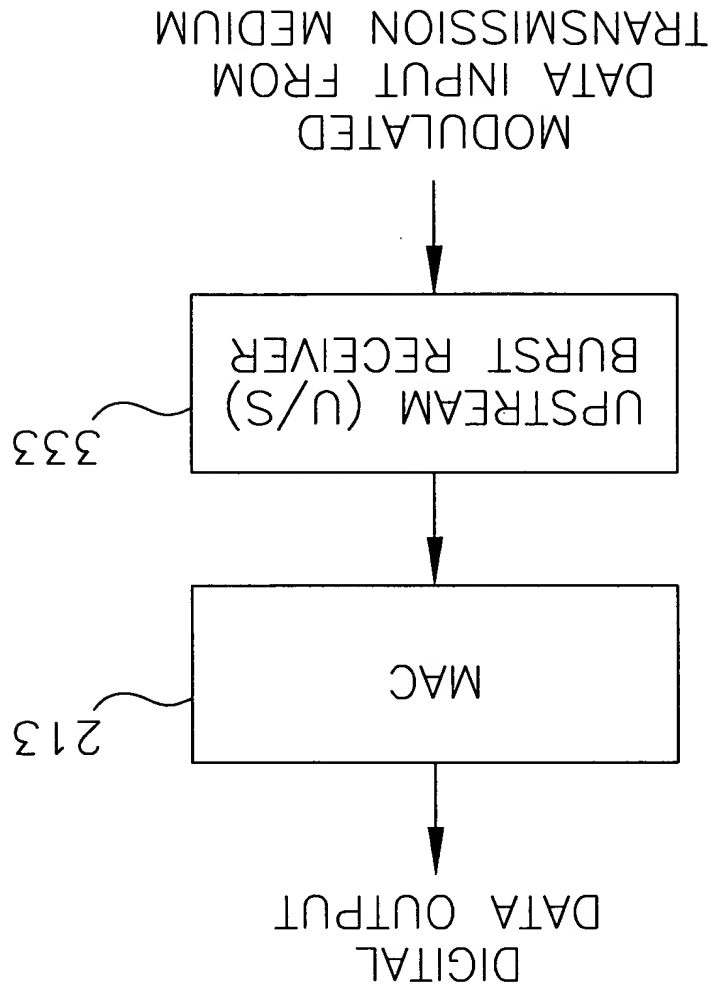


FIG. 28

FIG.30

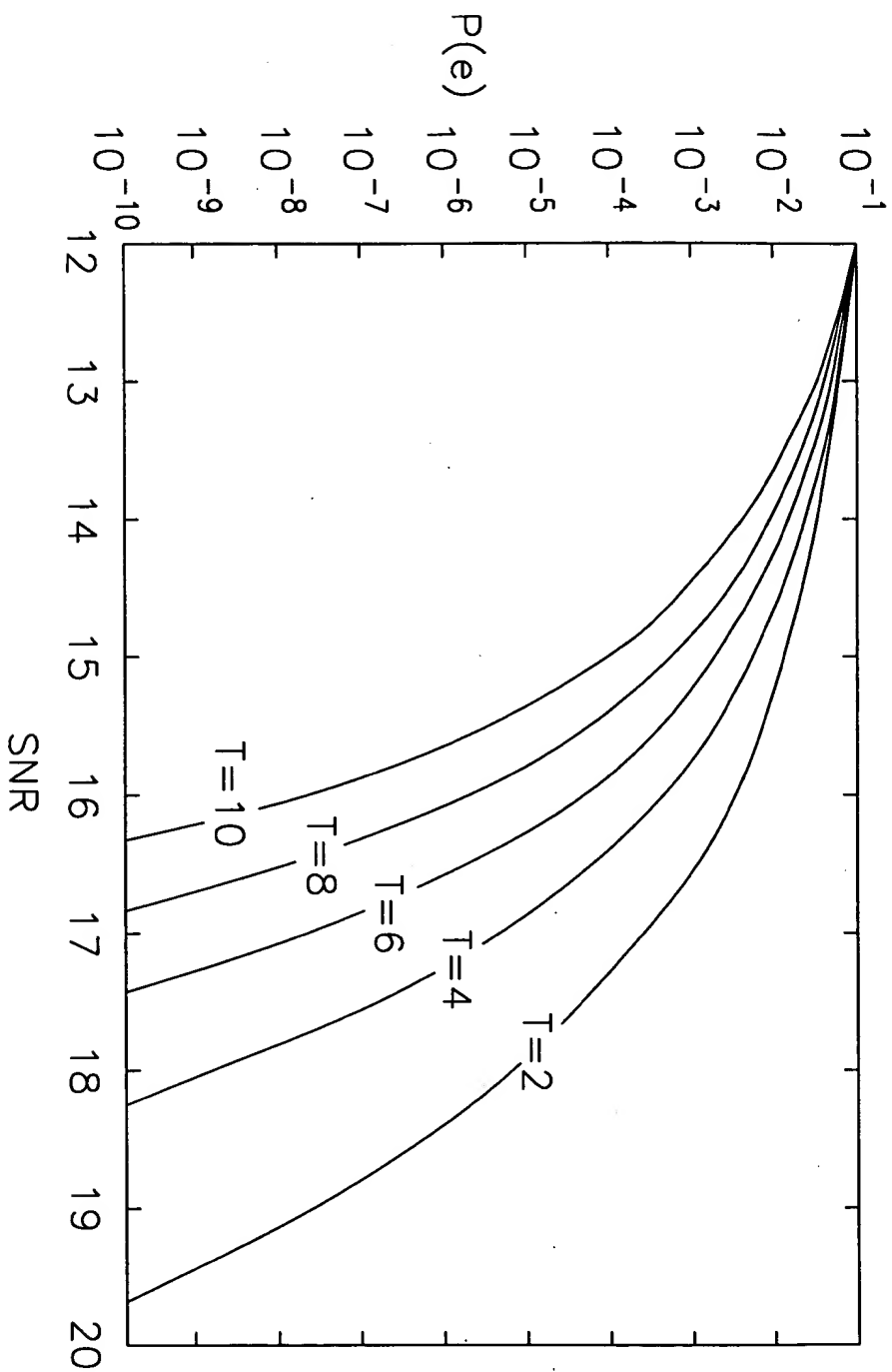


FIG. 31

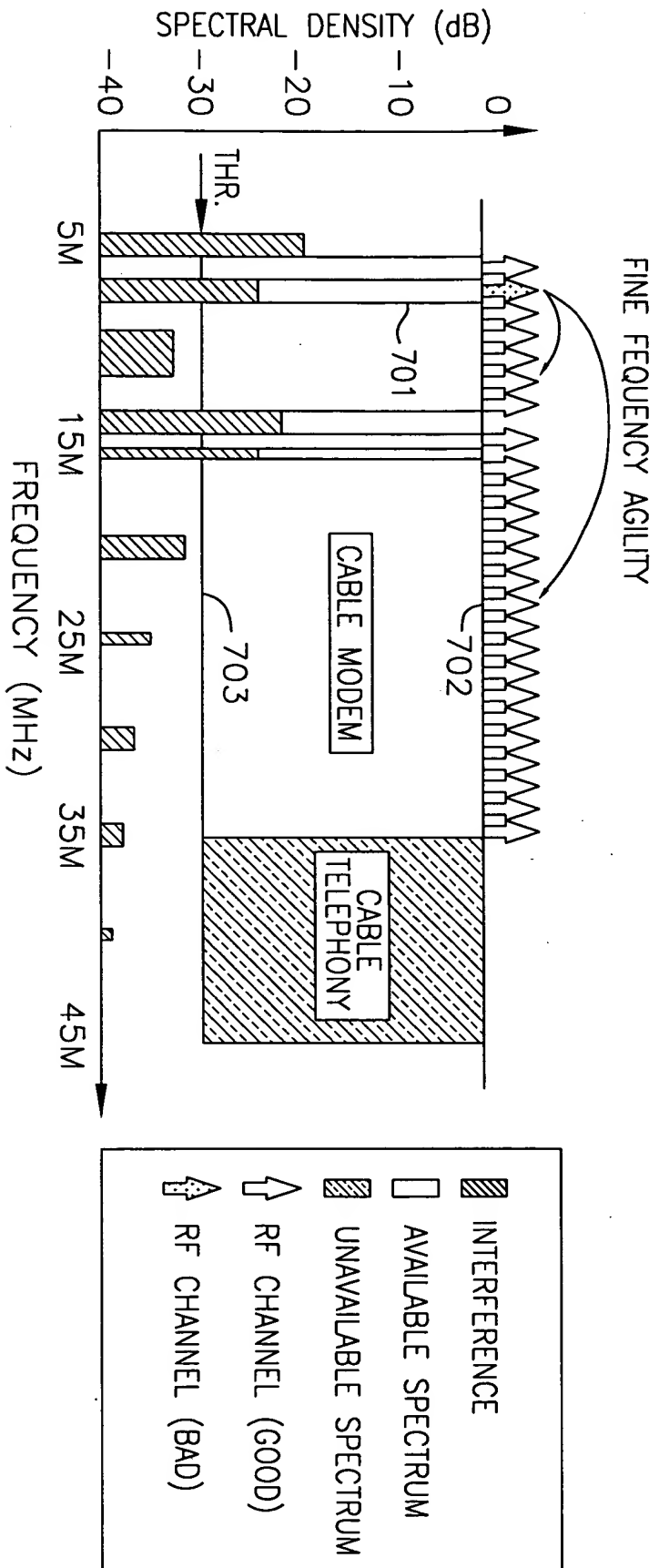


FIG. 32

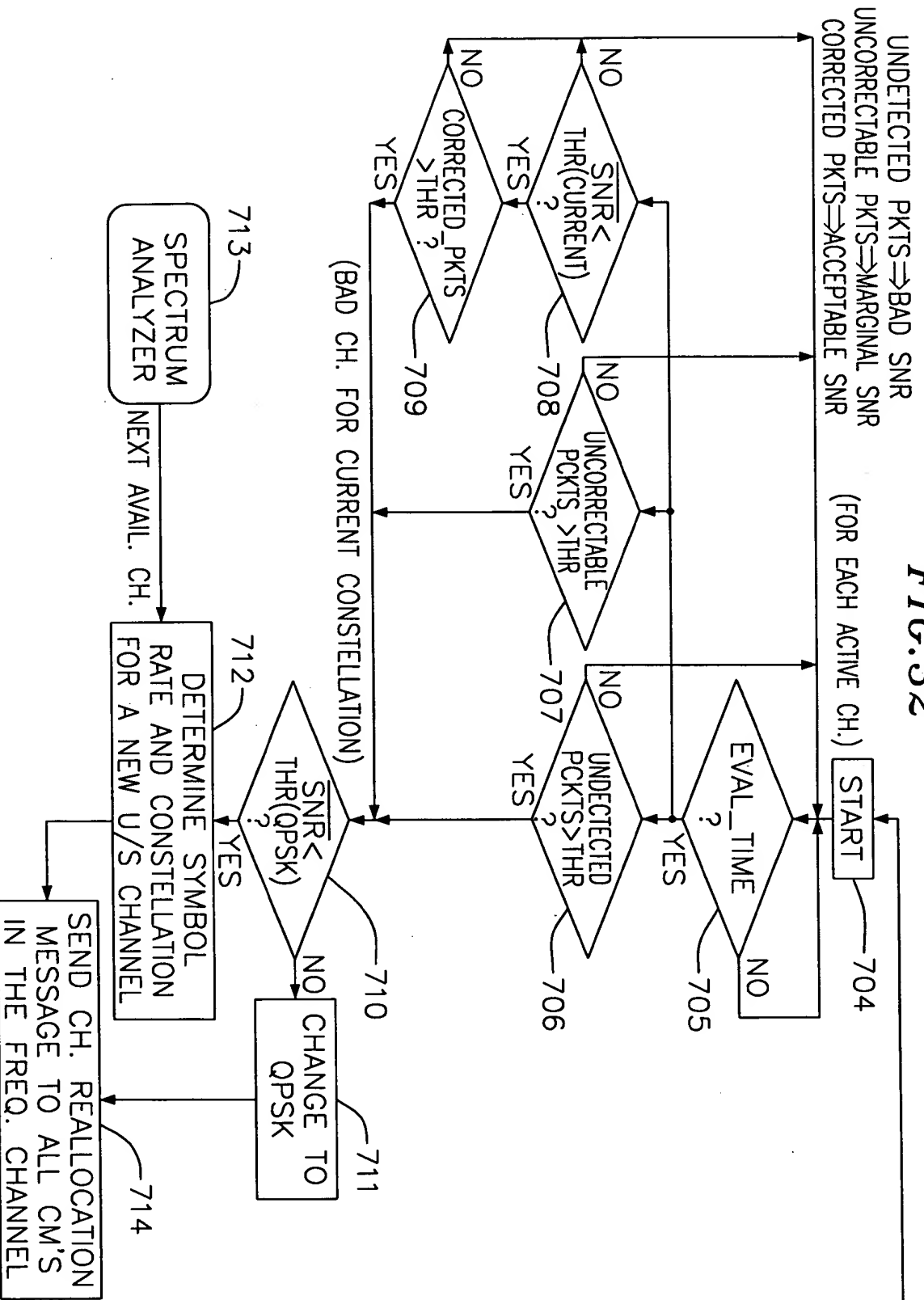


FIG. 33

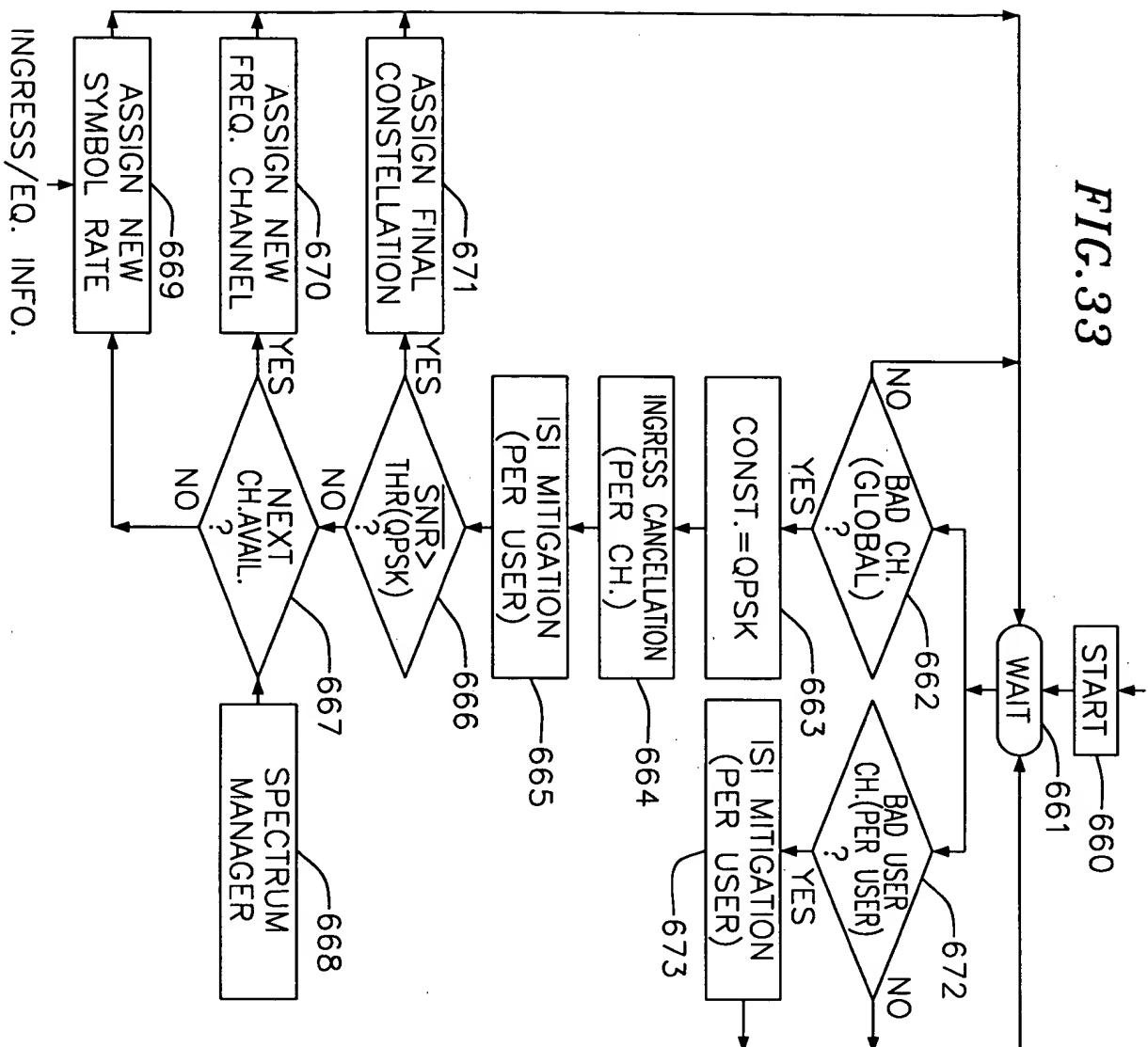


FIG. 34

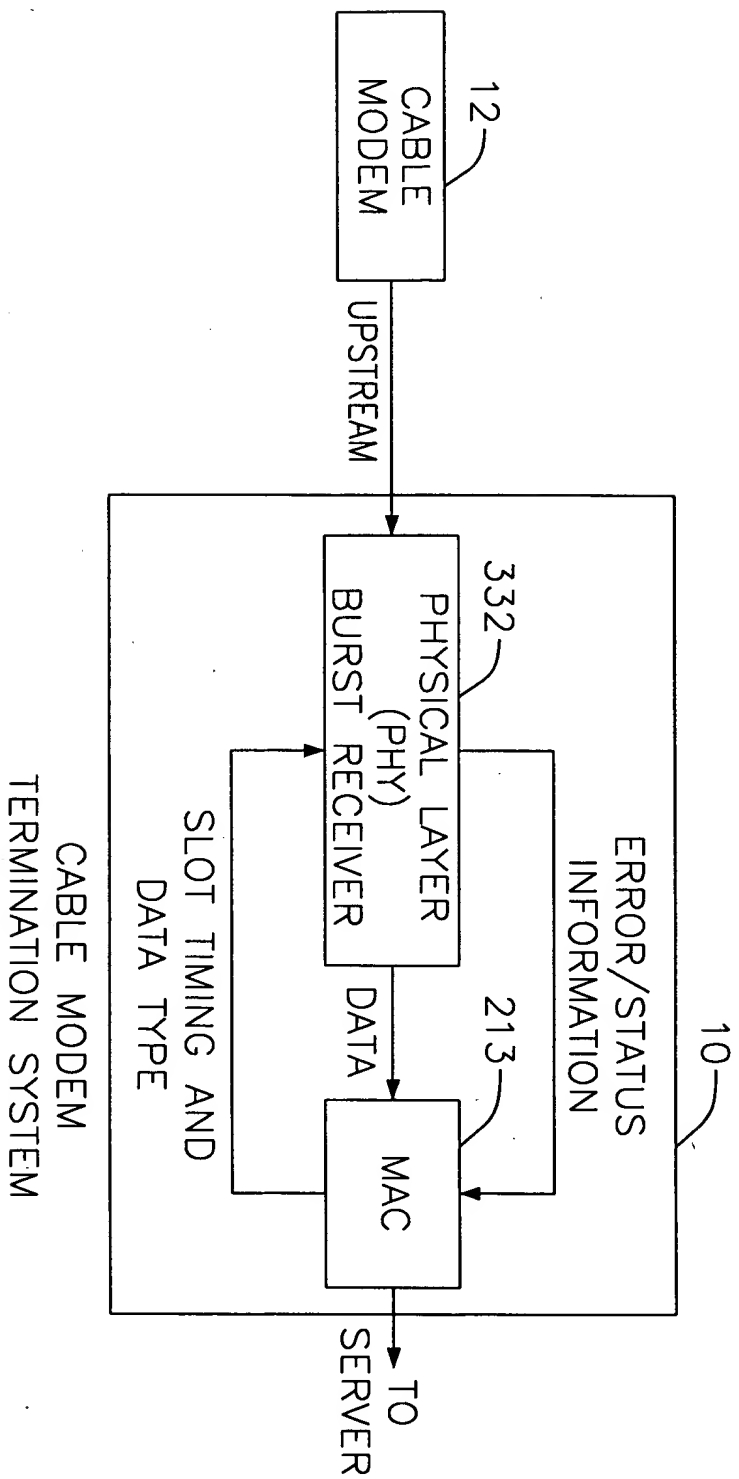


FIG. 35

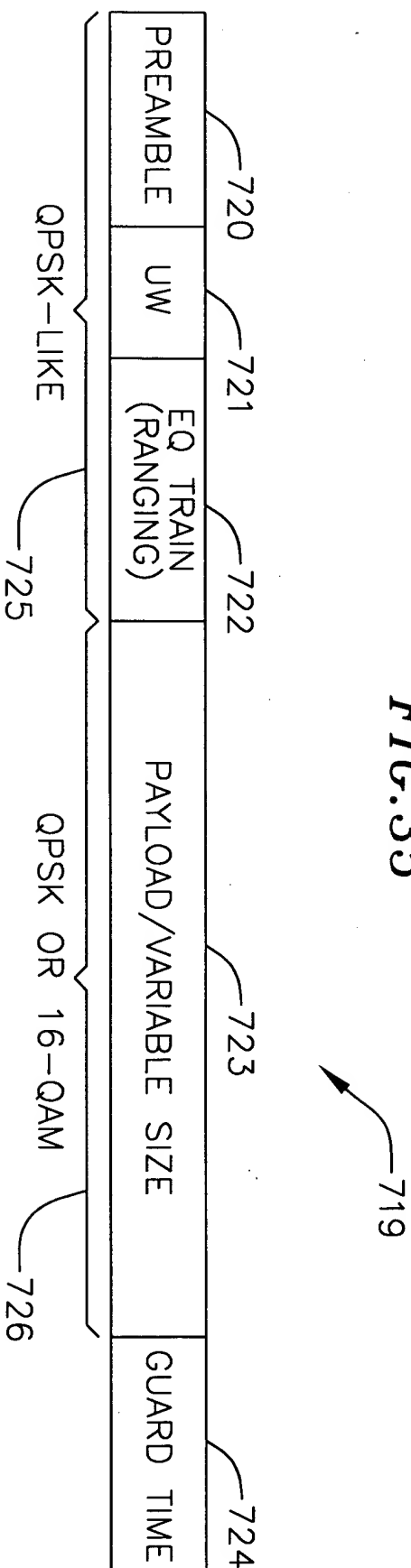


FIG. 37

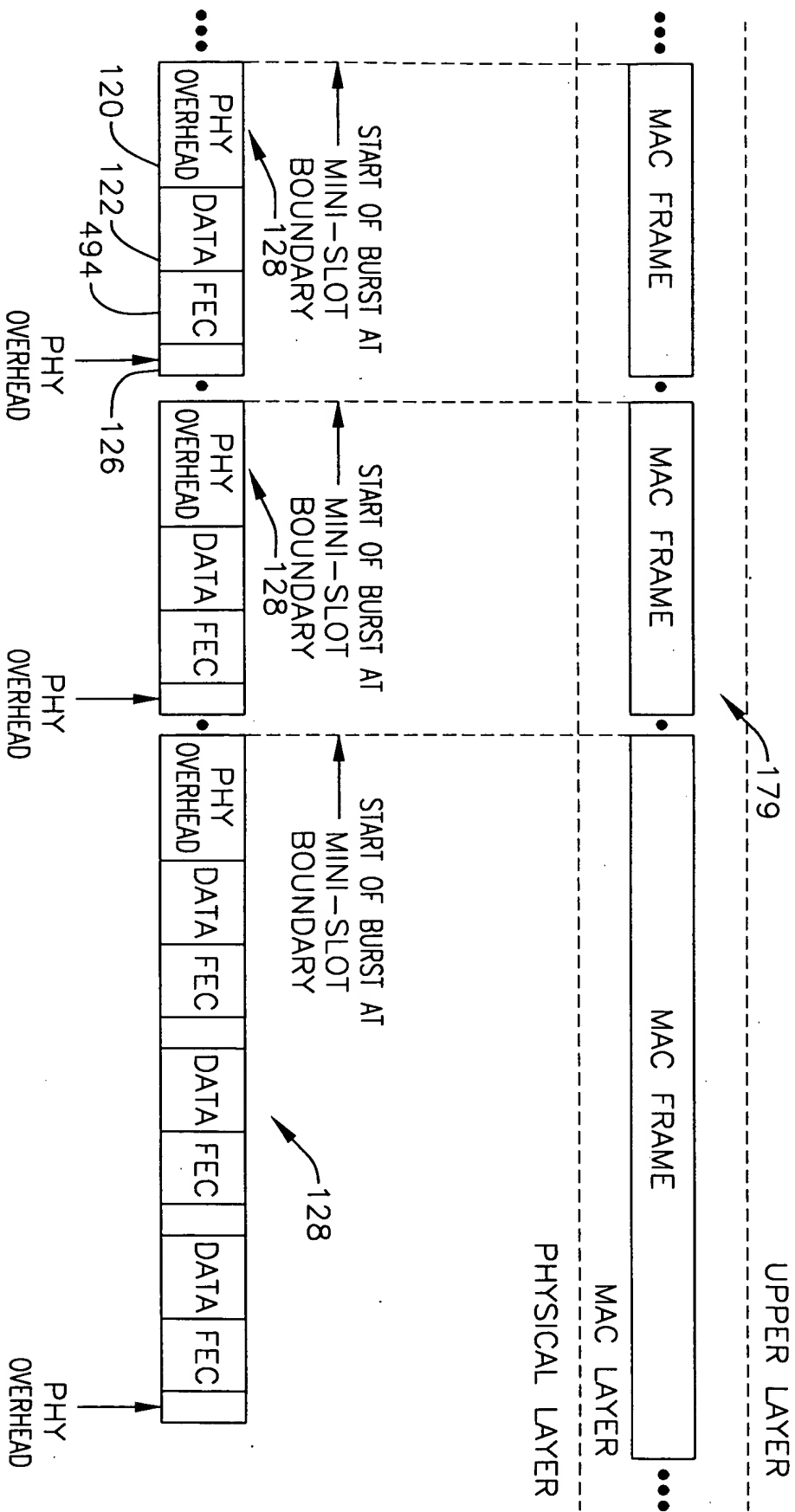
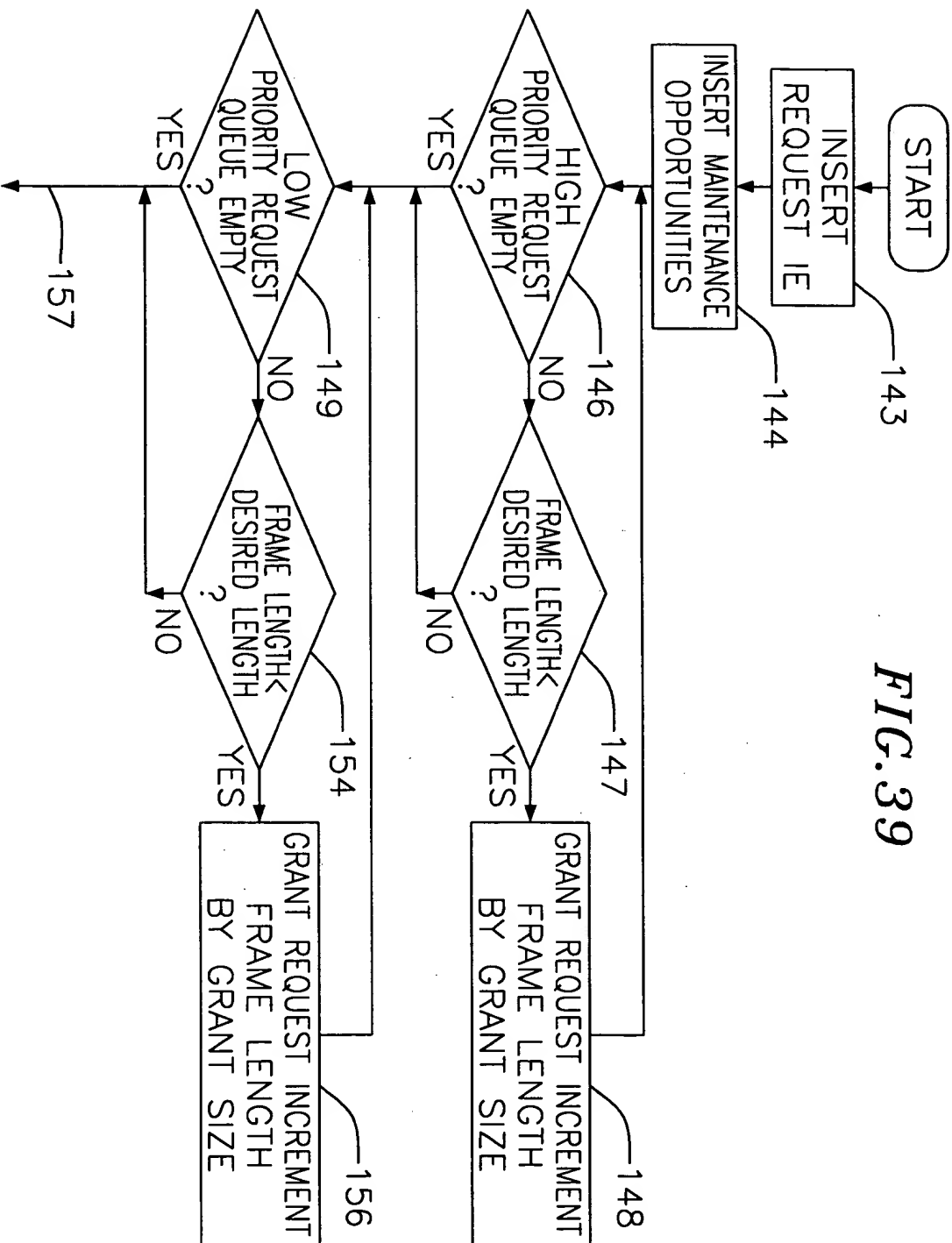


FIG. 39




```
graph TD
    157(( )) --> 158{BANDWIDTH REQUEST QUEUES EMPTY?}
    158 -- NO --> 160[PLACE ZERO LENGTH GRANT IN MAP FOR EACH REQUEST IN EACH QUEUE]
    158 -- YES --> 162{FRAMELENGTH < DESIRED LENGTH?}
    160 --> 162
    162 -- YES --> 164[PAD TO DESIRED LENGTH WITH DATA IN CONTENTION DATA REGION]
    162 -- NO --> 185[ADD ACKS TO MAP TRANSMIT MAP CALCULATE NEXTMAPTIME]
    164 --> 185
```

The flowchart illustrates the logic for processing bandwidth requests and frame lengths. It begins with a decision diamond (158) asking "BANDWIDTH REQUEST QUEUES EMPTY?". If the answer is "NO", the process proceeds to a rectangular block (160) labeled "PLACE ZERO LENGTH GRANT IN MAP FOR EACH REQUEST IN EACH QUEUE". If the answer is "YES", the process proceeds to another decision diamond (162) asking "FRAMELENGTH < DESIRED LENGTH?". From diamond 162, if the answer is "YES", the process proceeds to a rectangular block (164) labeled "PAD TO DESIRED LENGTH WITH DATA IN CONTENTION DATA REGION". If the answer is "NO", the process proceeds to a rectangular block (185) labeled "ADD ACKS TO MAP TRANSMIT MAP CALCULATE NEXTMAPTIME". Both the output of block 164 and the output of block 160 lead to the input of block 185.

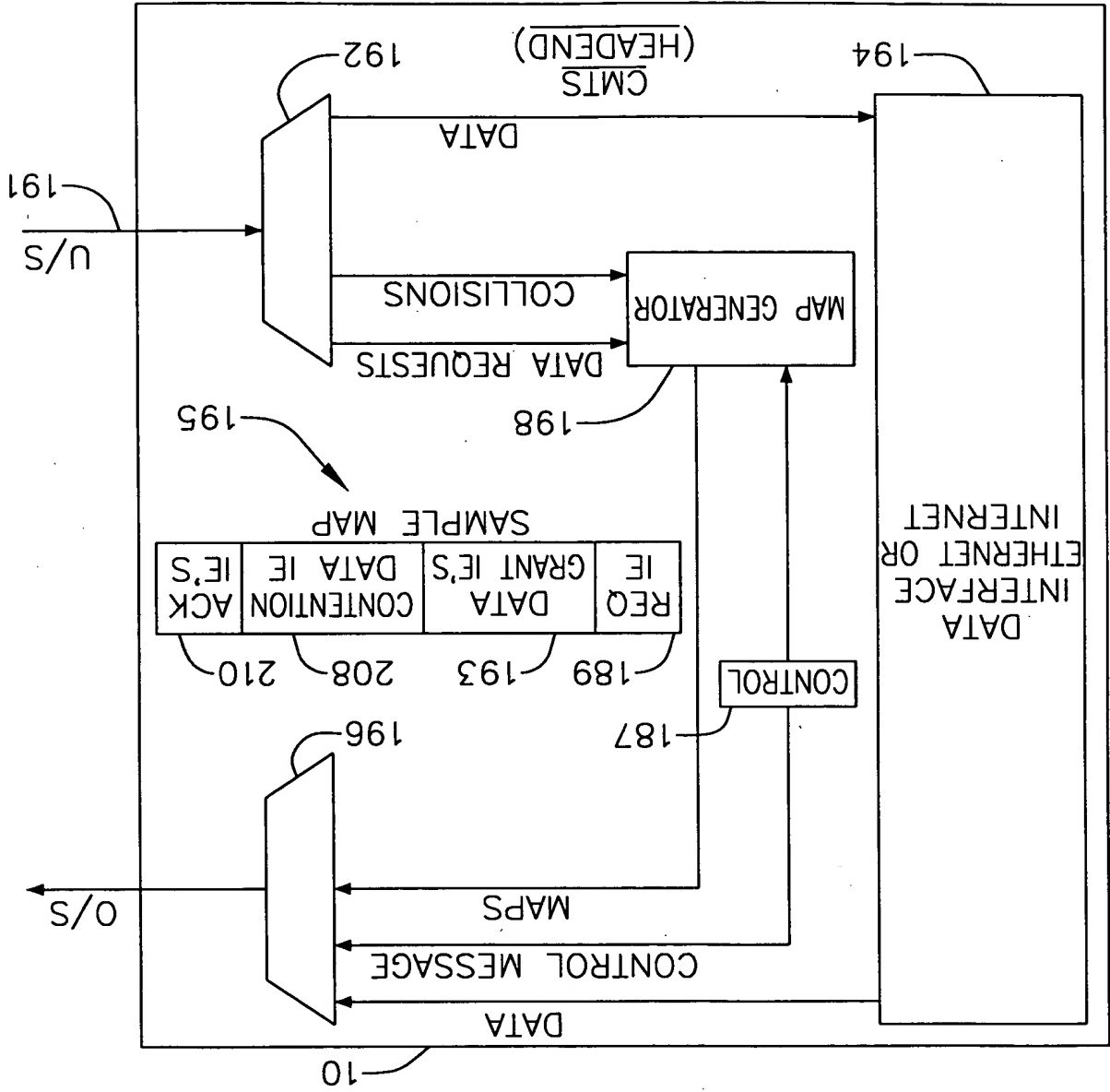
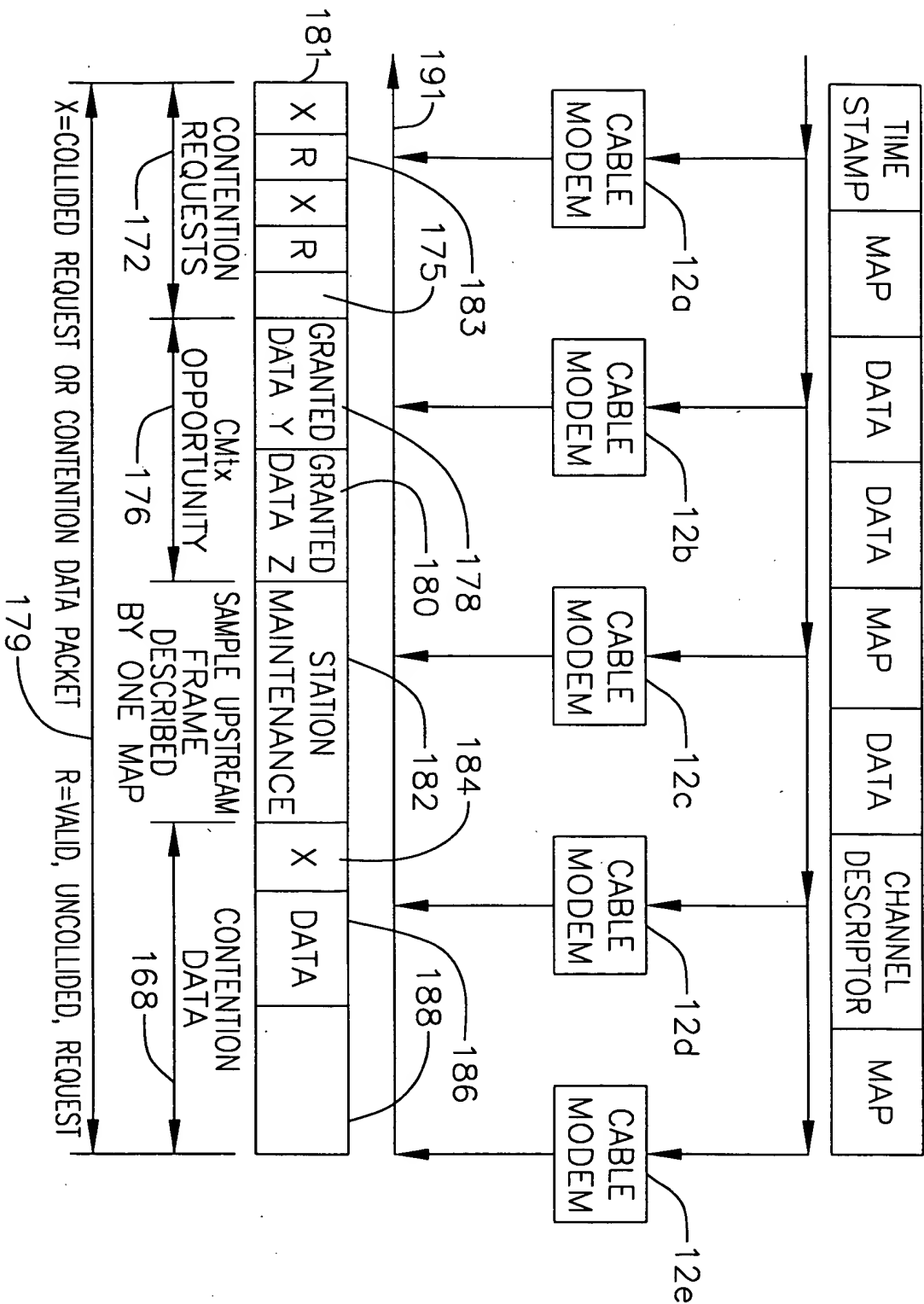


FIG. 41

FIG. 42



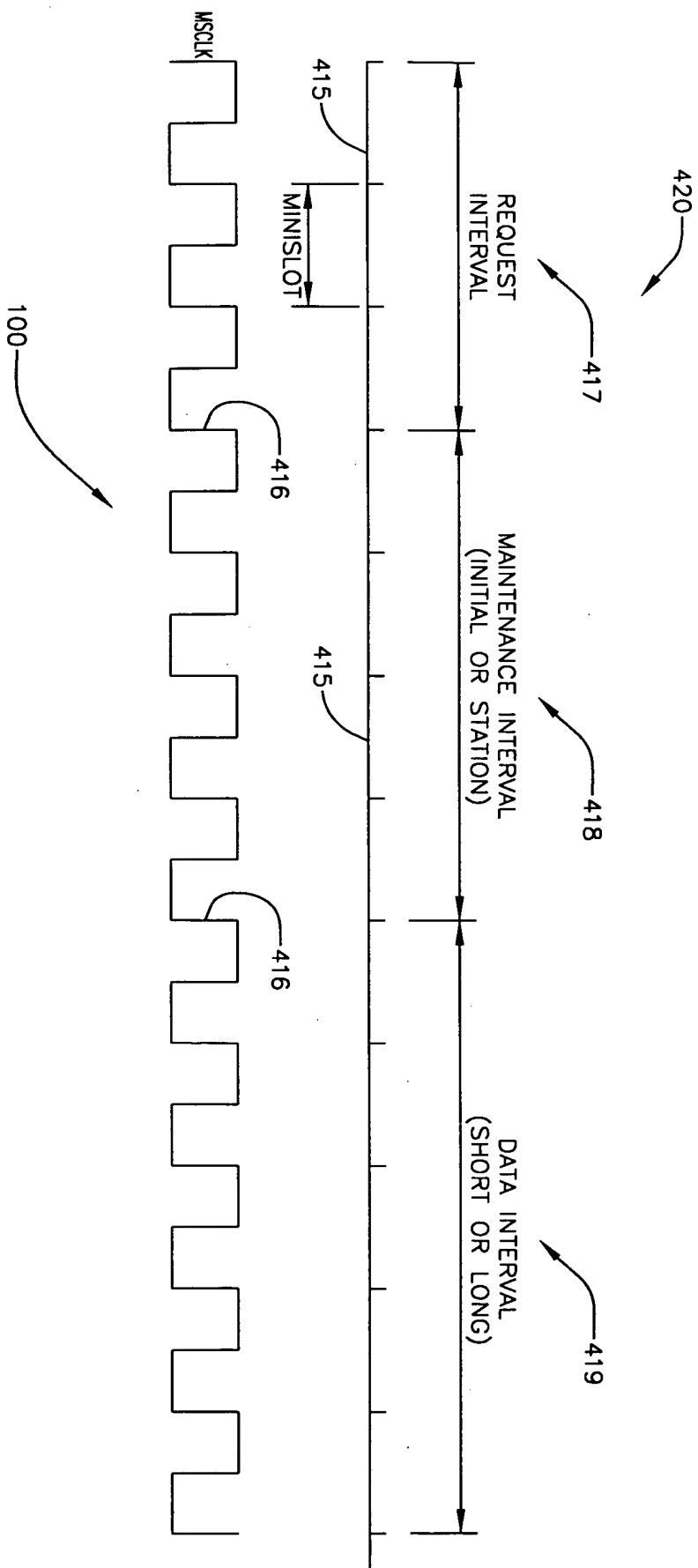


FIG. 44

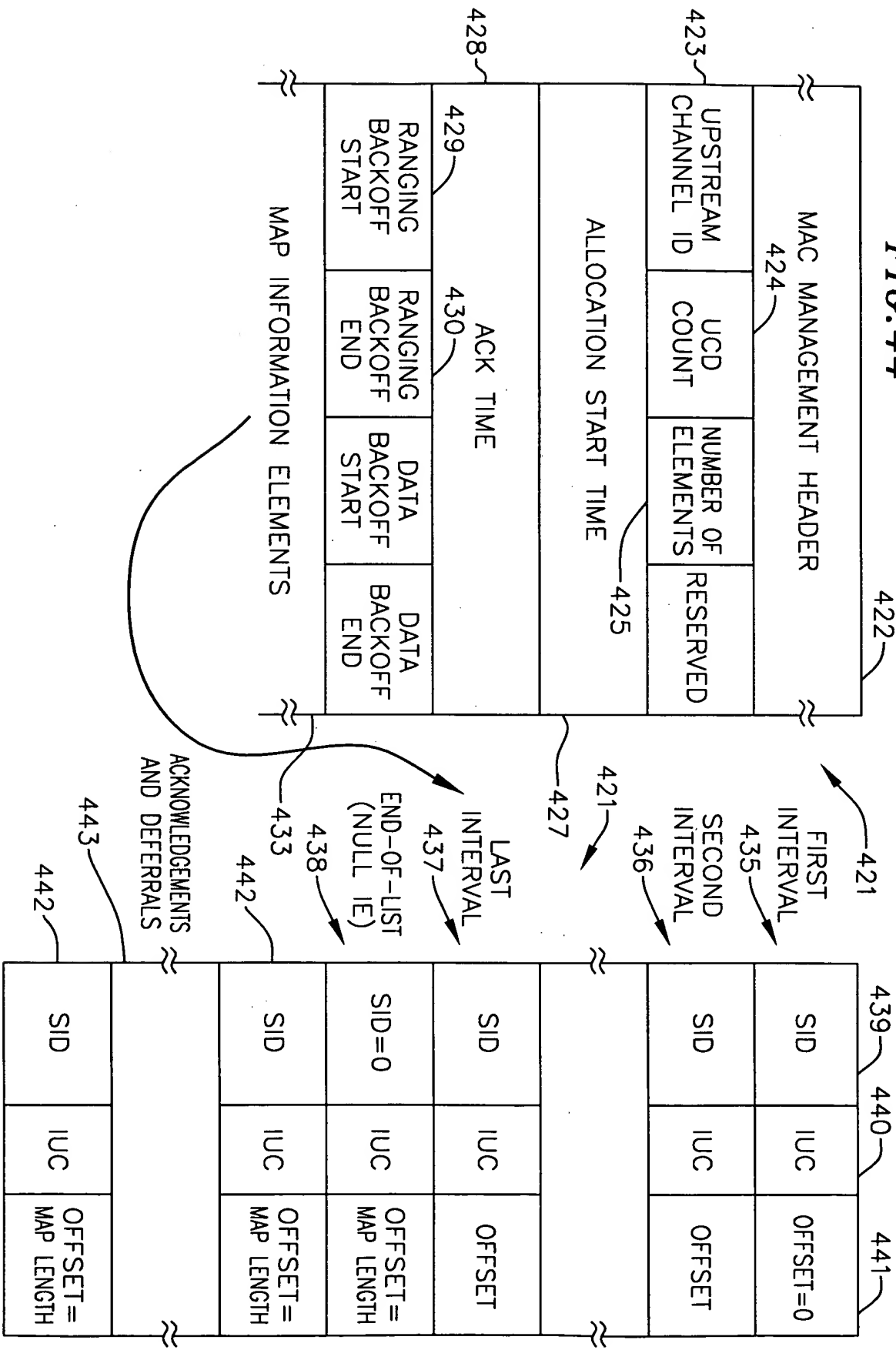


FIG. 45

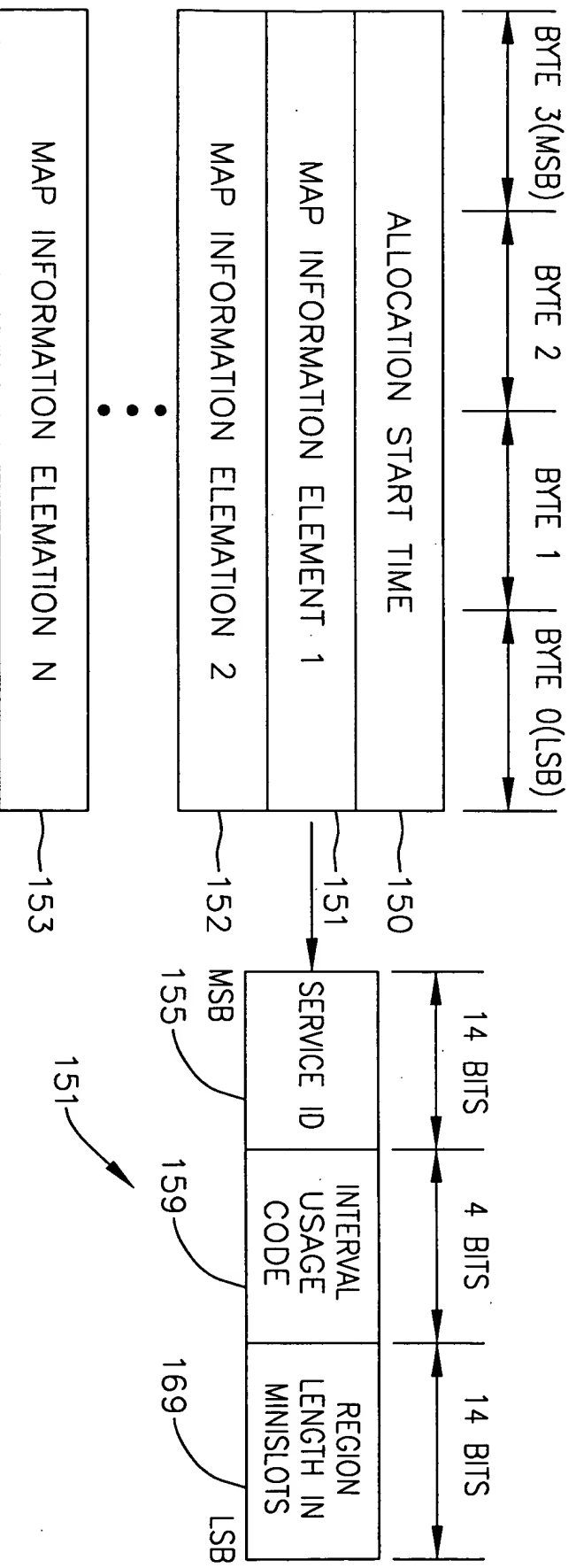
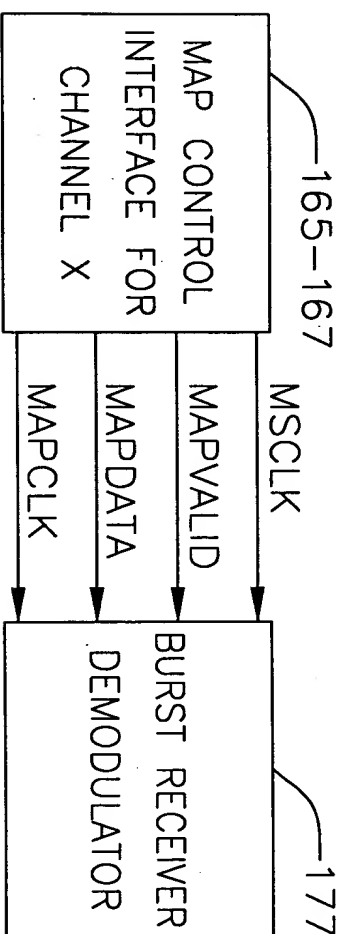


FIG. 47



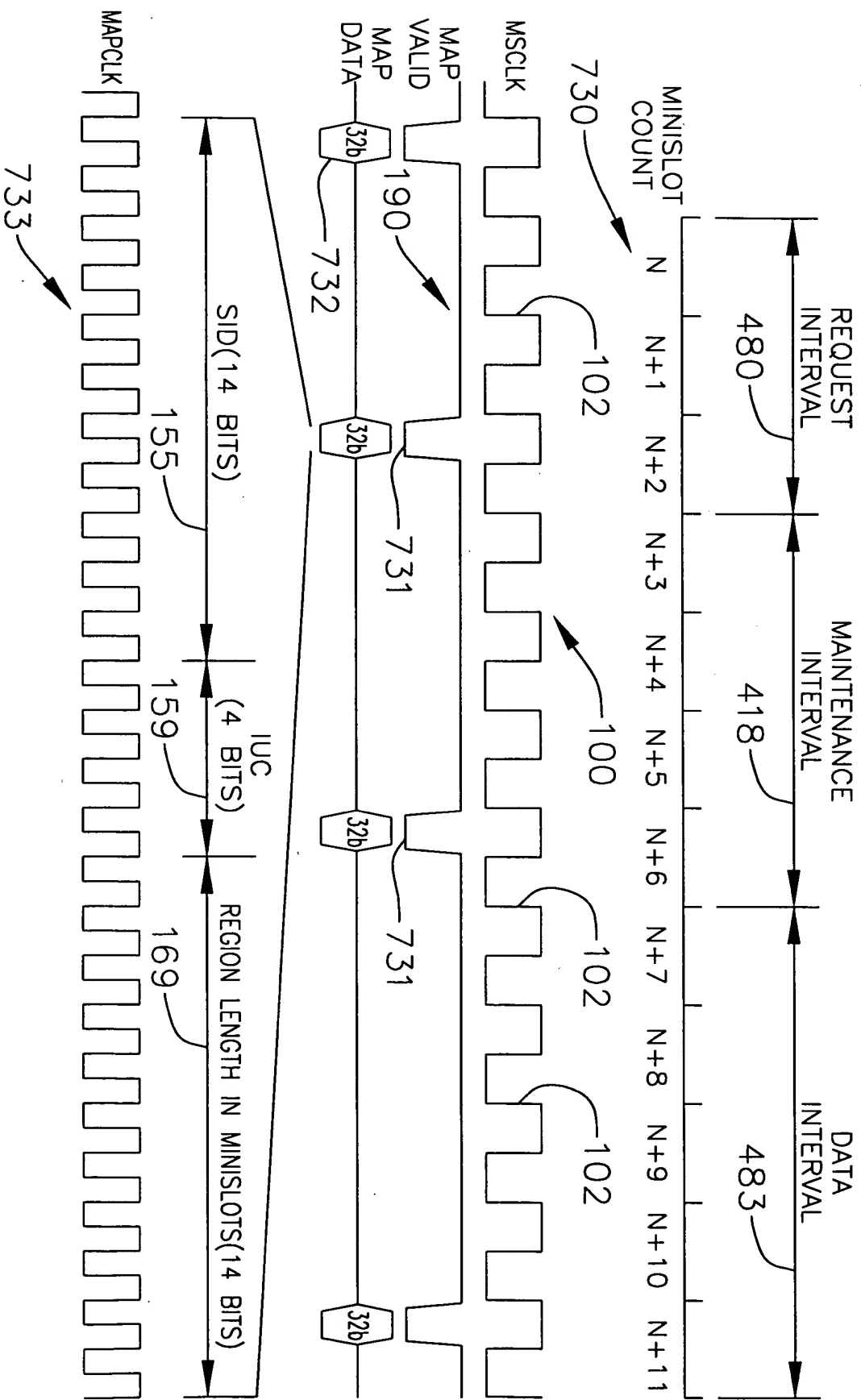
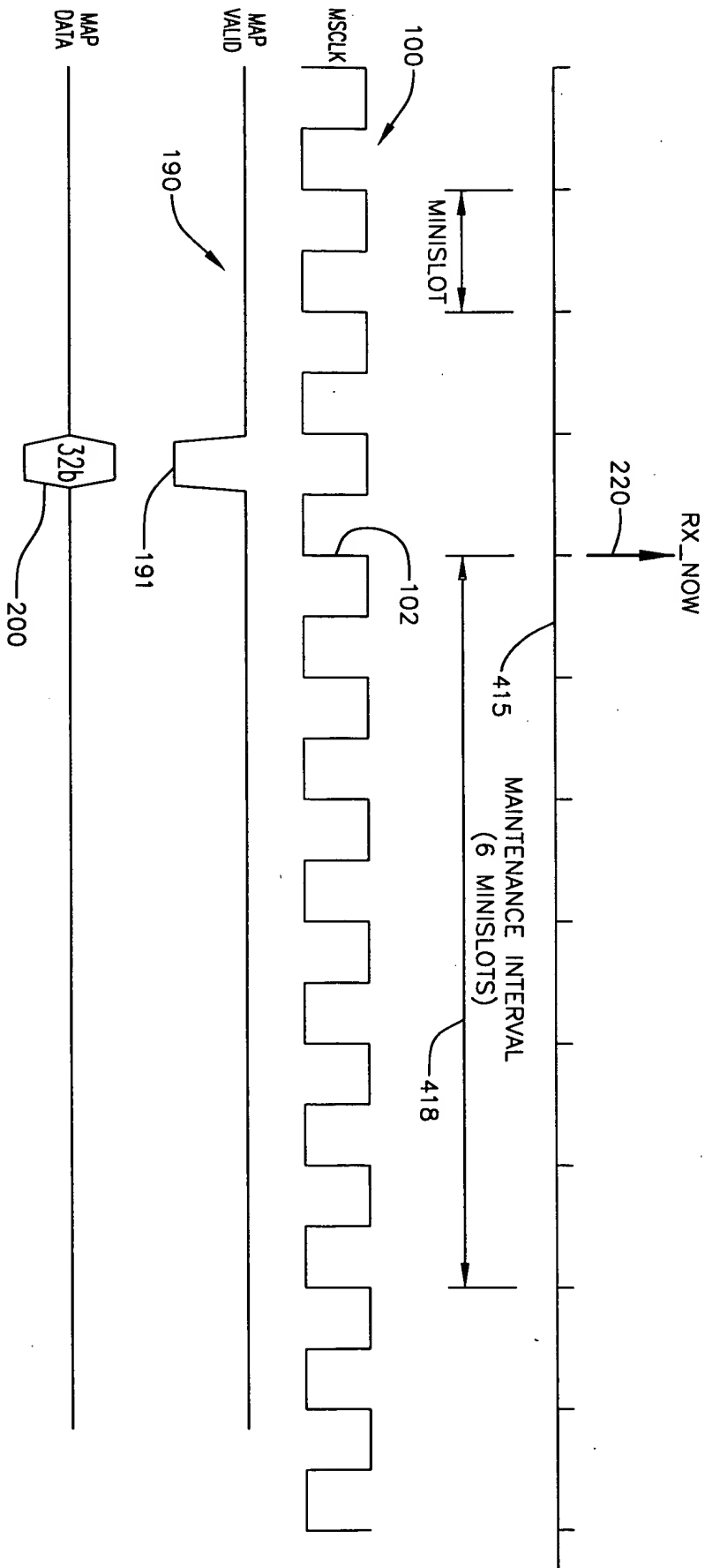


FIG. 49



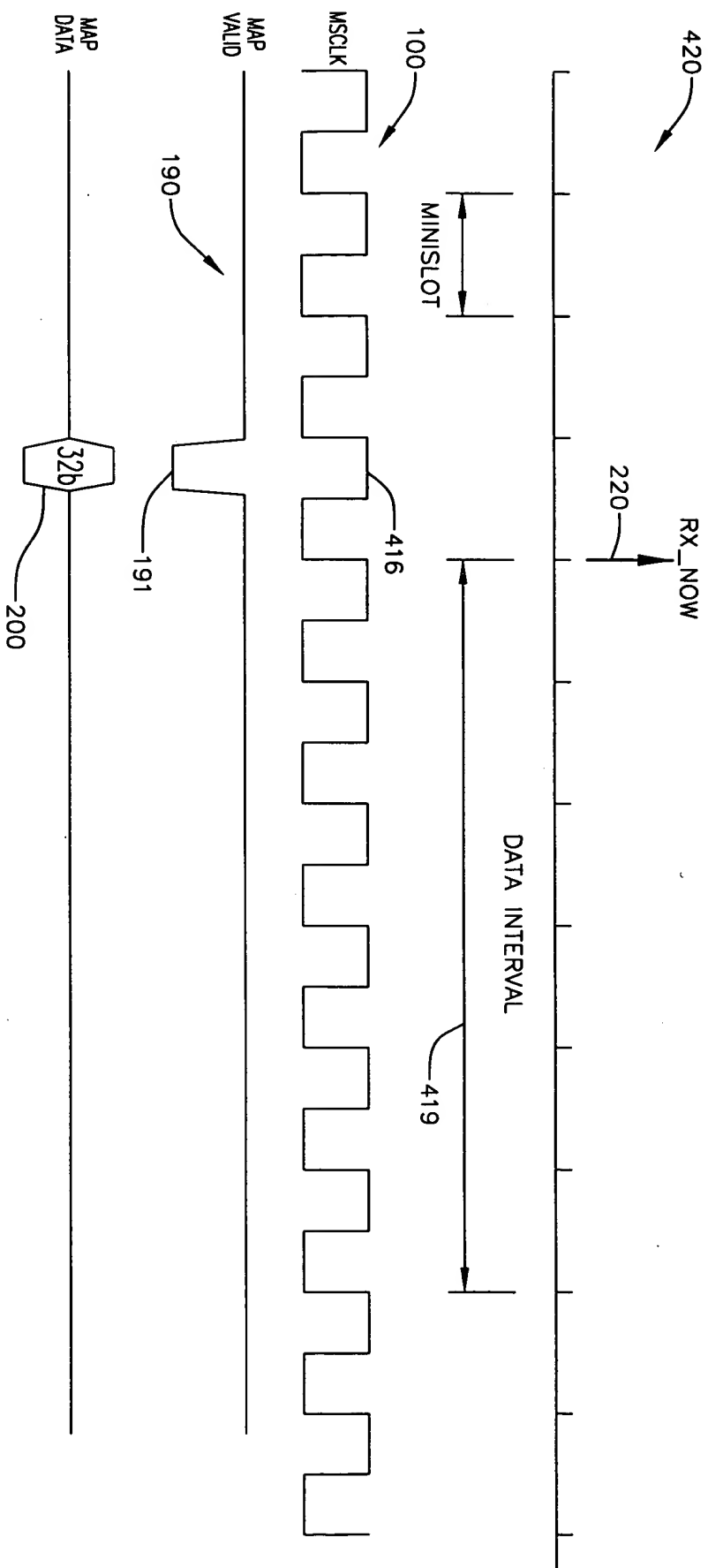
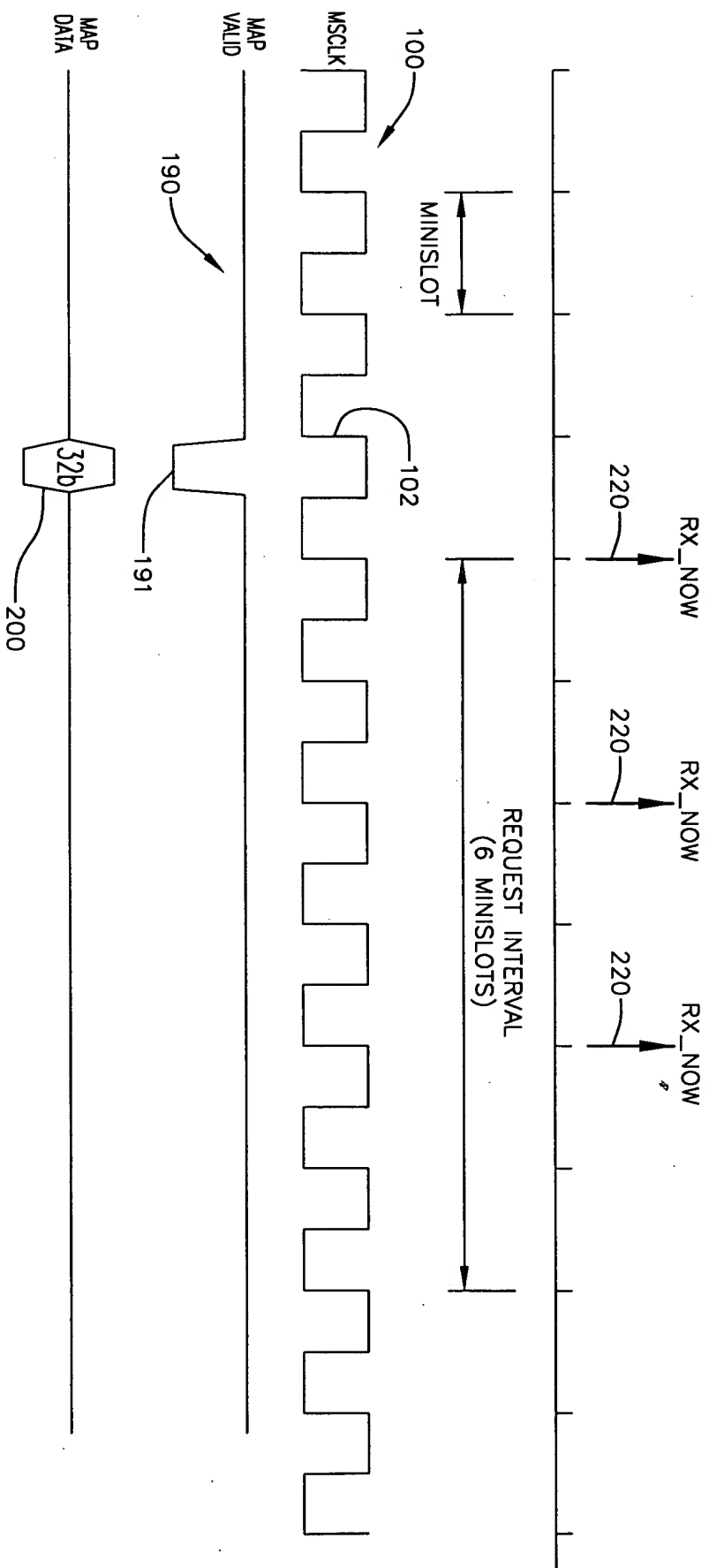


FIG. 51



SLOT DEFINITION	STATISTICS	CALCULATION
DATA	1.NUMBER OF SLOTS 2.NUMBER OF SLOTS WITH POWER BUT NO DATA 3.NUMBER OF SLOTS WITH BAD DATA 4.NUMBER OF GOOD DATA-SLOTS 5.TOTAL NUMBER OF FEC BLOCKS 6.NUMBER OF FEC BLOCKS WITH CORRECTABLE ERRORS 7.NUMBER OF UNCORRECTABLE FEC BLOCKS	NO UW UW AND (BAD FEC OR BAD HEC) UW AND GOOD HEC
REQUEST(CONTENTION)	1.NUMBER OF REQUESTS RECEIVED 2.NUMBER OF COLLIDED REQUESTS 3.NUMBER OF CORRUPTED REQUESTS	NO UW NO UW OR BAD FEC OR BAD HEC
REQUEST/DATA (CONTENTION)	1.NUMBER OF PACKETS RECEIVED 2.NUMBER OF COLLIDED PACKETS 3.NUMBER OF CORRUPTED PACKETS	NO UW NO UW OR BAD FEC OR BAD HEC
RANGING	1.NUMBER OF RANGING MESSAGES RECEIVED 2.NUMBER OF COLLIDED RANGING MESSAGES RECEIVED 3.NUMBER OF CORRUPTED RANGING MESSAGES	NO UW NO UW OR BAD FEC OR BAD HEC

BASED ON THE STATUS BYTES[7:5] BITS, THE FOLLOWING STATISTICS ARE KEPT USING COUNTERS.

FIG.54

STATUS	2 BYTES	TIMESTAMP	4 BYTES	CH. ID	1 BYTE	SID	2 BYTES	PWR.	2 BYTES	FREQ.	2 BYTES	TIME	3 BYTES	EQUALIZER COEFFS.	32 BYTES
--------	---------	-----------	---------	--------	--------	-----	---------	------	---------	-------	---------	------	---------	-------------------	----------

RNG. OFFSET 7 BYTES

FIG.53

STATUS	2 BYTES	TIMESTAMP	4 BYTES	CH. ID	1 BYTE	SID	2 BYTES	PWR.	2 BYTES	FREQ.	2 BYTES	TIME	3 BYTES
--------	---------	-----------	---------	--------	--------	-----	---------	------	---------	-------	---------	------	---------

RNG. OFFSET 7 BYTES

FIG.52

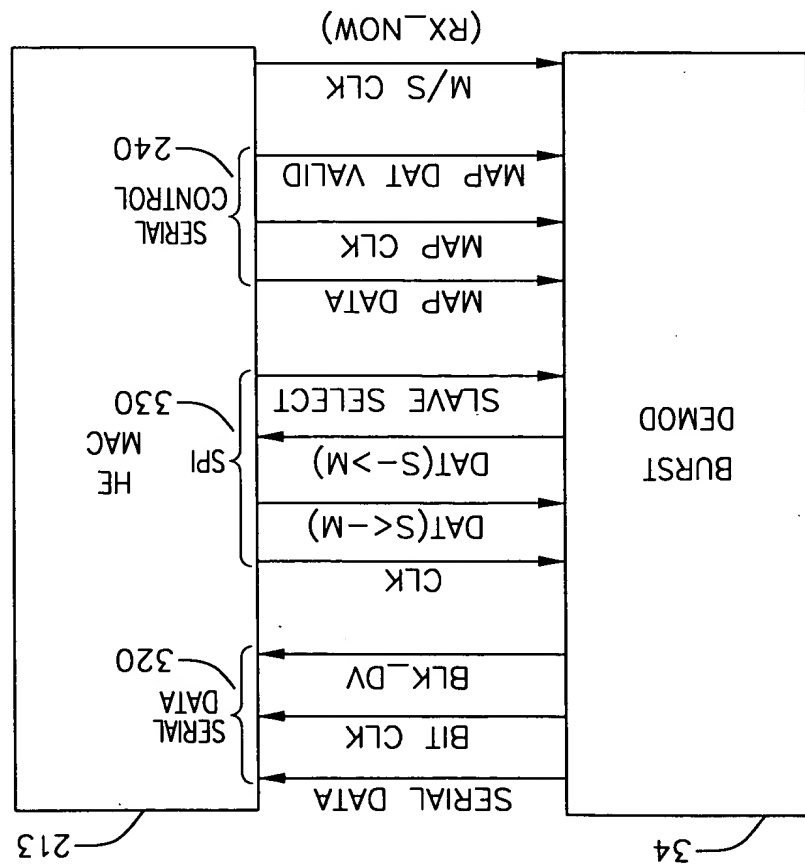


FIG. 57

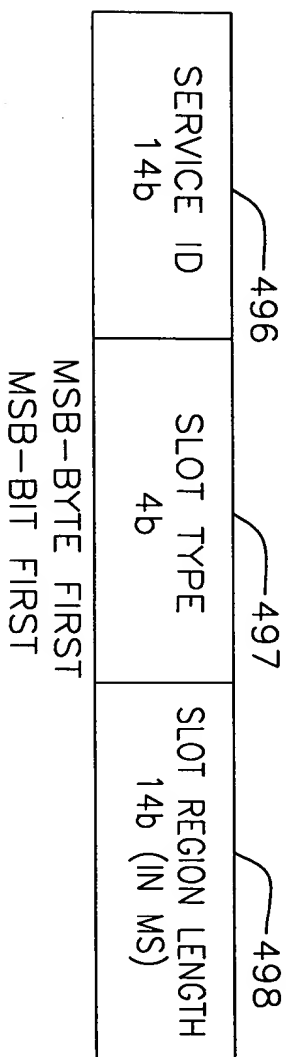


FIG. 58

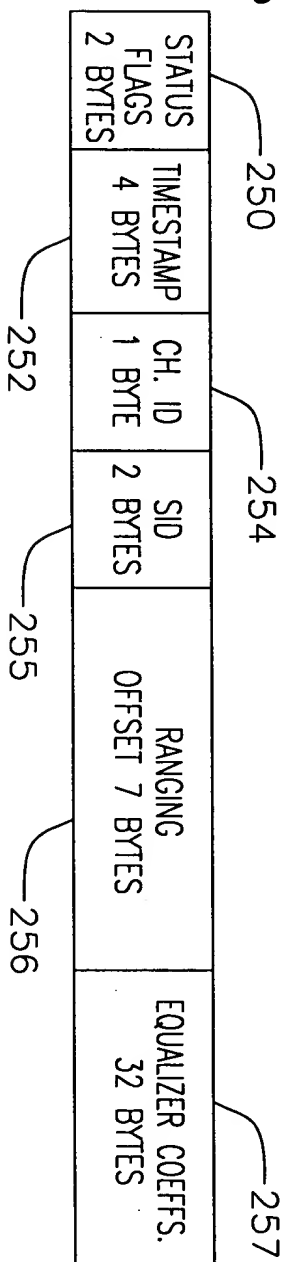


FIG. 59

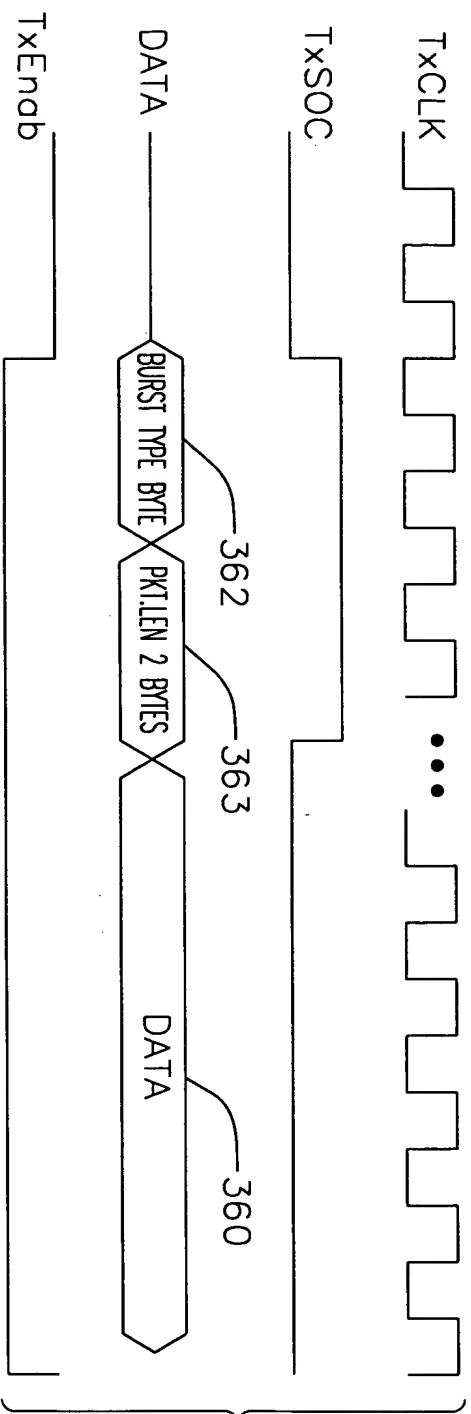
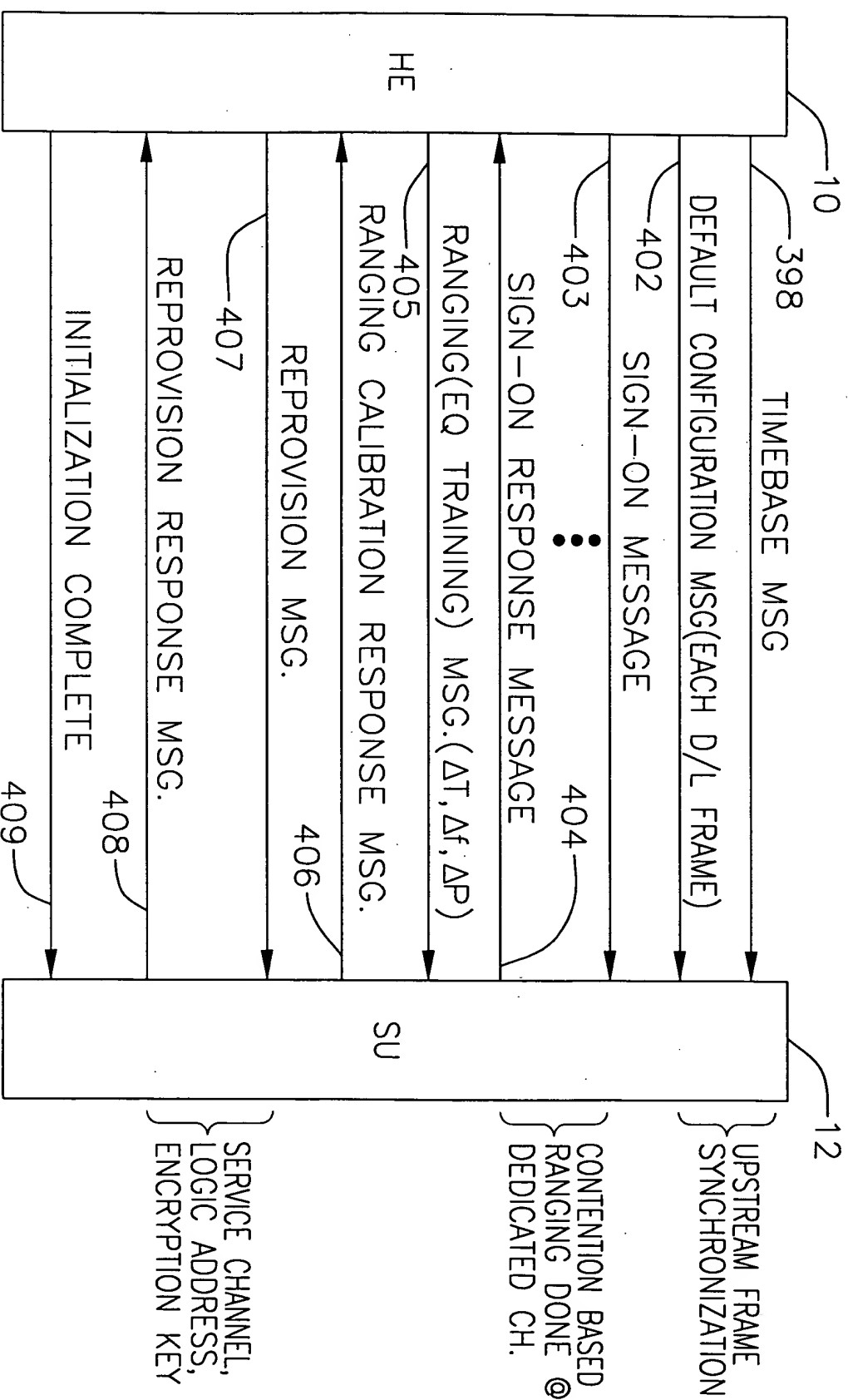


FIG. 60





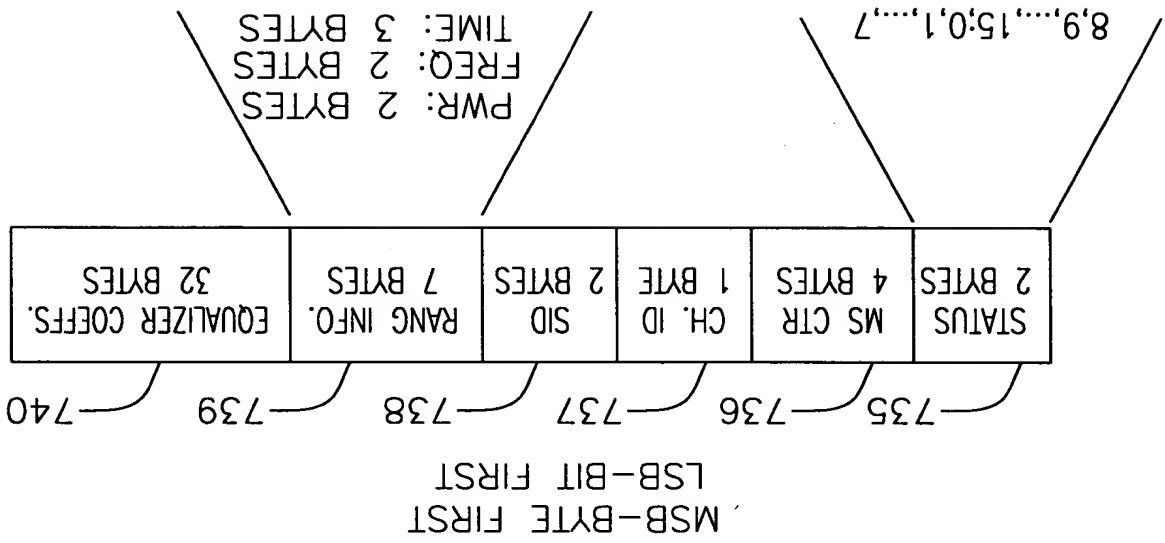


FIG. 62

FIG. 63

BIT FIELD	DEFINITION IF BIT[11]=1	DEFINITION IF BIT[11]=0
BIT[15:12]	DOCSIS IUC	RESERVED
BIT[11]	1:INDICATES 1ST. BLOCK OF TRANSMISSION	0:INDICATES NOT 1ST. BLOCK OF TRANSMISSION
BIT[10]	1:INDICATES LAST BLOCK OF TRANSMISSION	1:INDICATES LAST BLOCK OF TRANSMISSION
BIT[9]	1:INDICATES RANGING REQUIRED	RESERVED
BIT[8]	RESERVED	RESERVED
BIT[7:5]	000:FEC OK 001:CORRECTABLE FEC ERROR 010:UNCORRECTABLE FEC ERROR 011:NO UNIQUE WORD DETECTED 100:COLLIDED PACKET 101:NO ENERGY 110:PACKET LENGTH VIOLATION	000:FEC OK 001:CORRECTABLE FEC ERROR 010:UNCORRECTABLE FEC ERROR 011:NO UNIQUE WORD DETECTED 100:COLLIDED PACKET 101:NO ENERGY 110:PACKET LENGTH VIOLATION
BIT[4]	1:VALID MINISLOT COUNT PREPENDED	RESERVED
BIT[3]	1:VALID CHANNEL ID PREPENDED	RESERVED
BIT[2]	1:VALID SID PREPENDED	RESERVED
BIT[1]	1:RANGING INFO PREPENDED	RESERVED
BIT[0]	1:EQUALIZER COEFFICIENTS PREPENDED	RESERVED

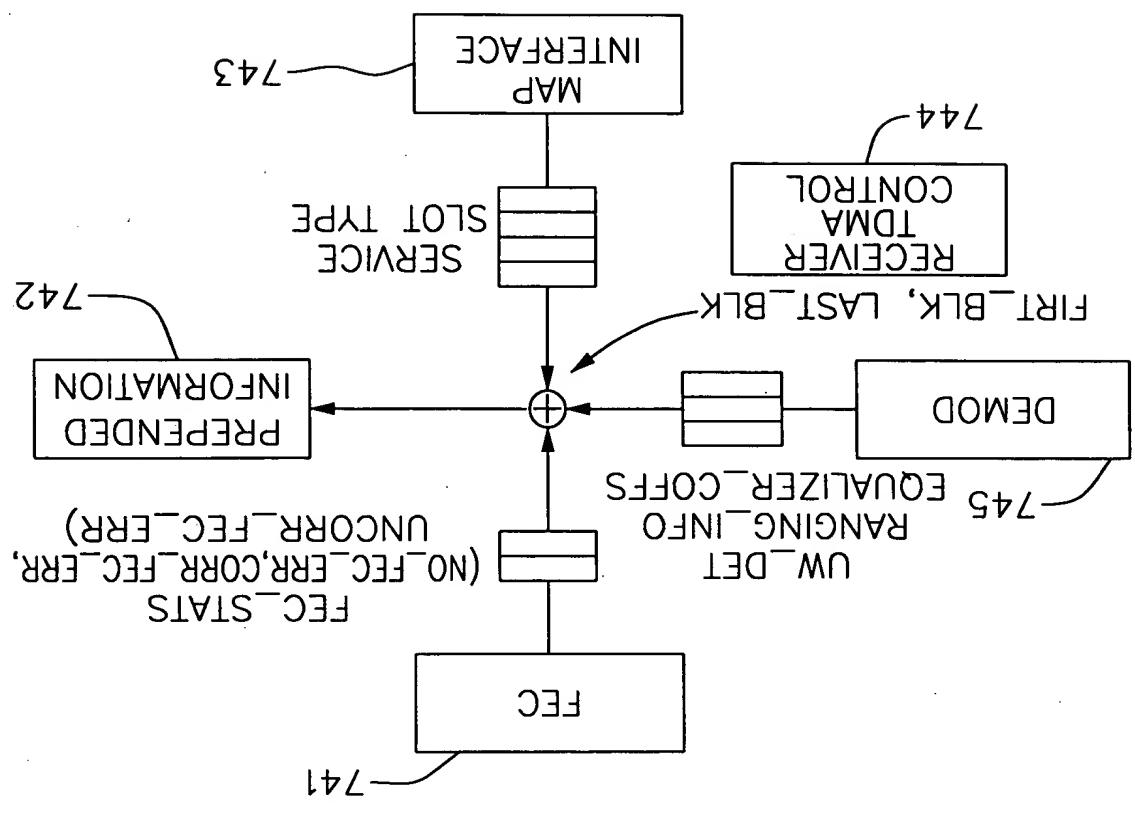


FIG. 64

FIG. 65

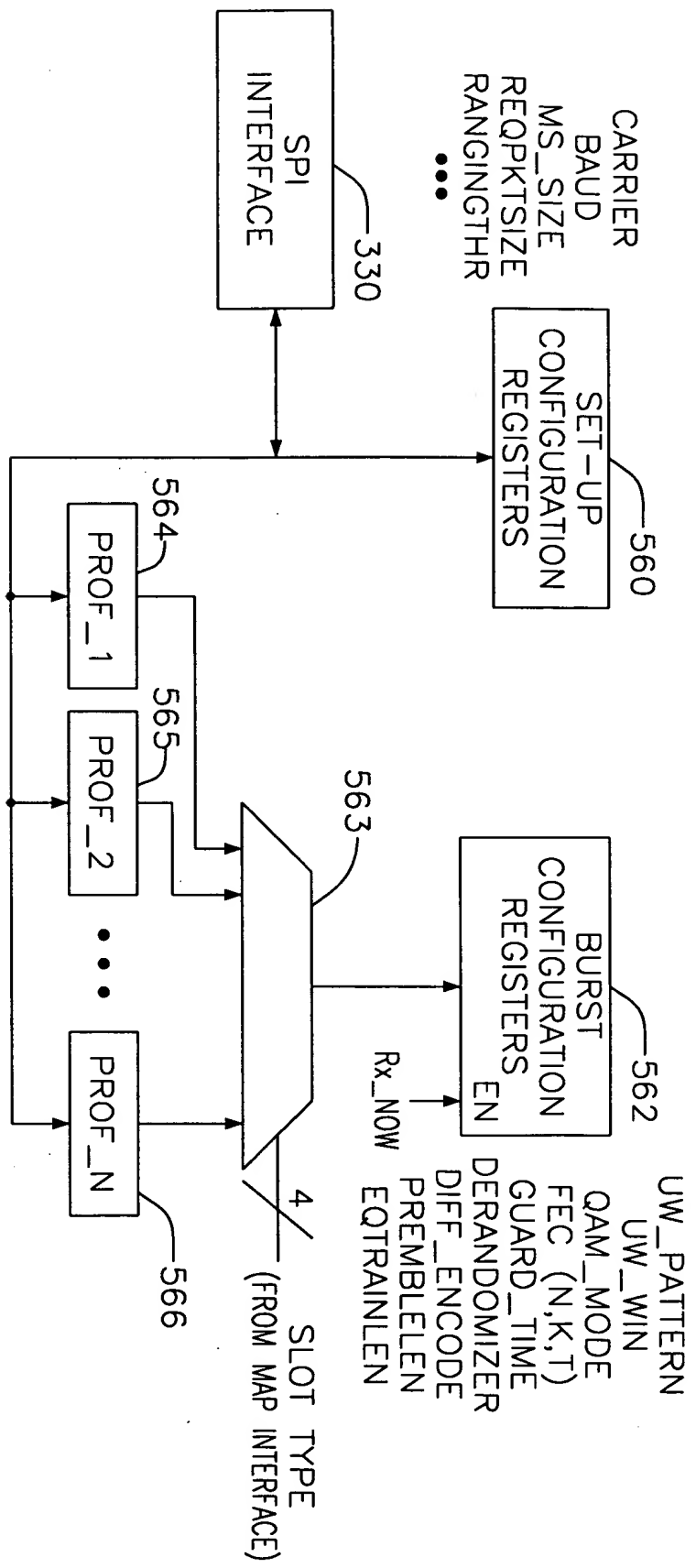


FIG. 66

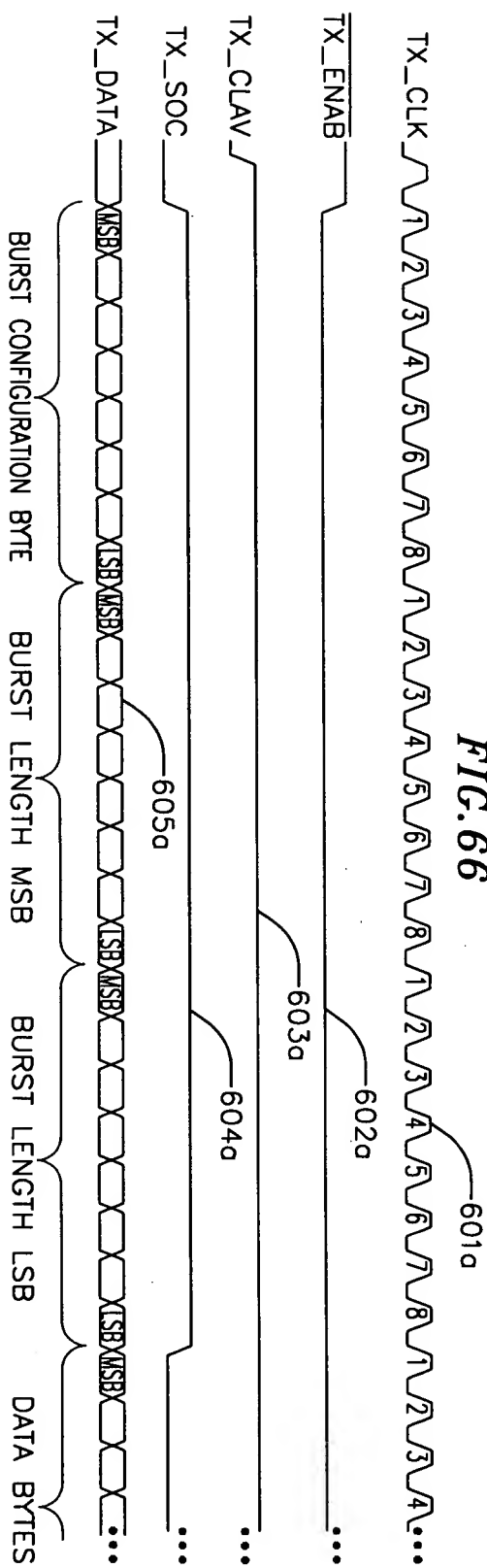


FIG. 67

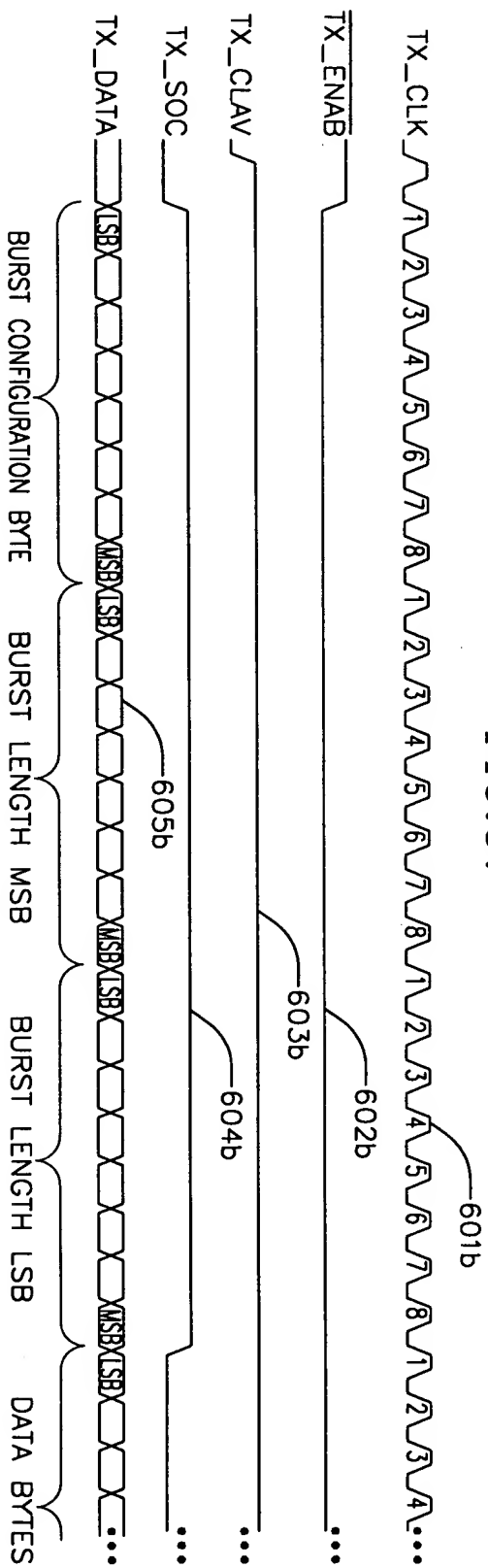
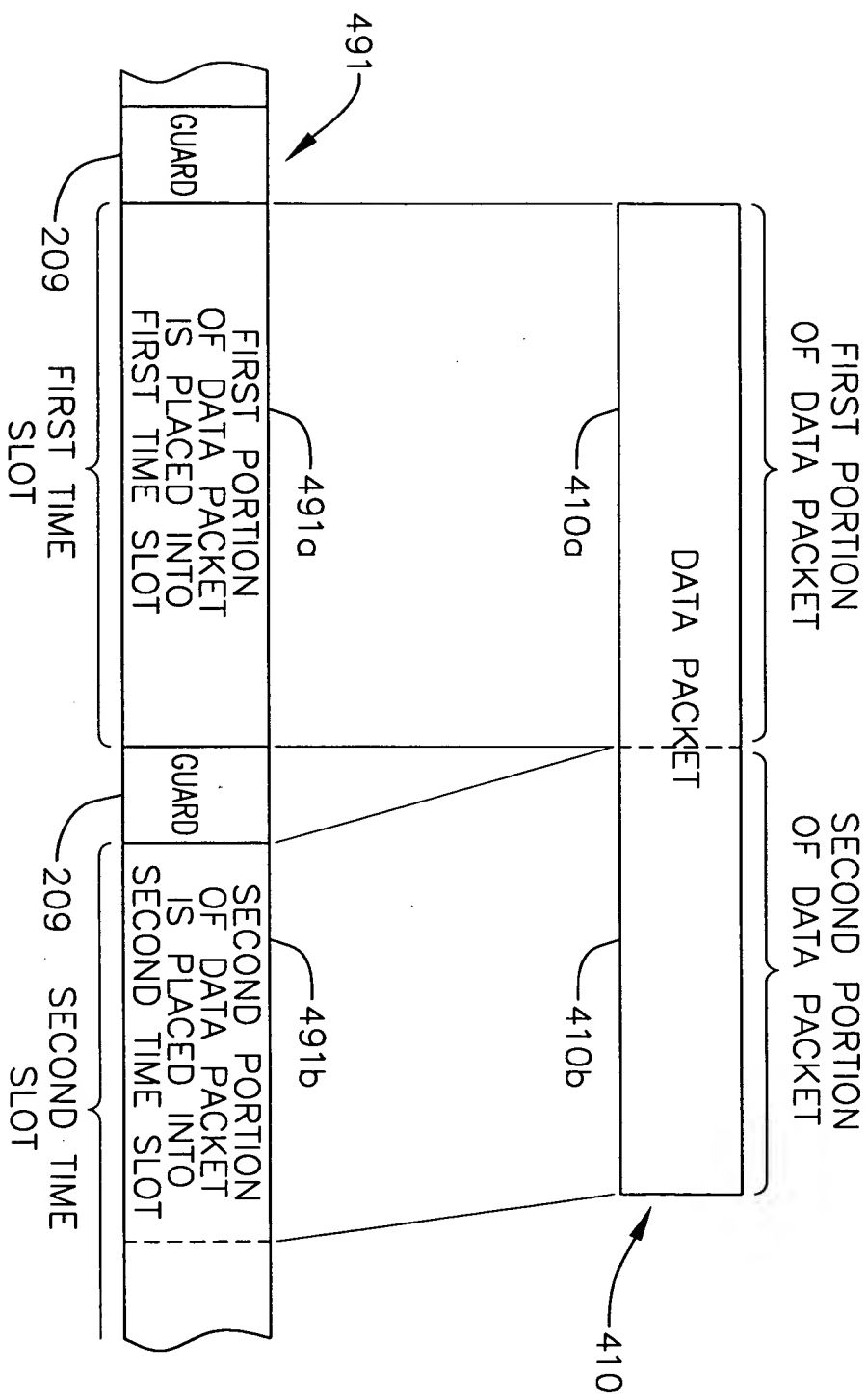


FIG. 68



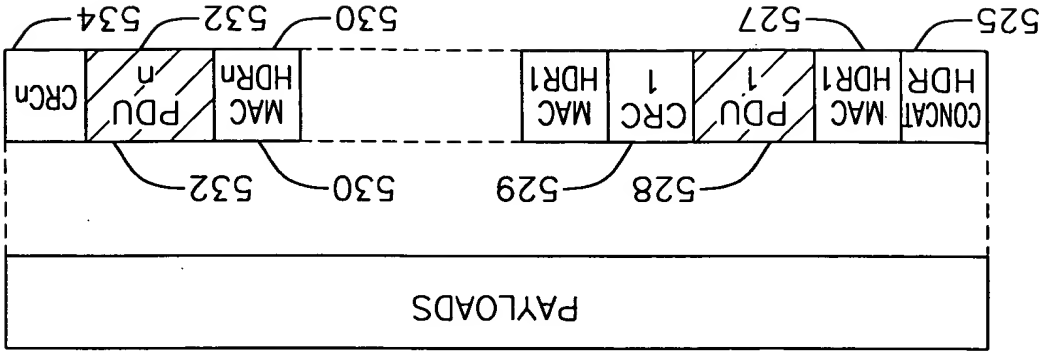


FIG. 70

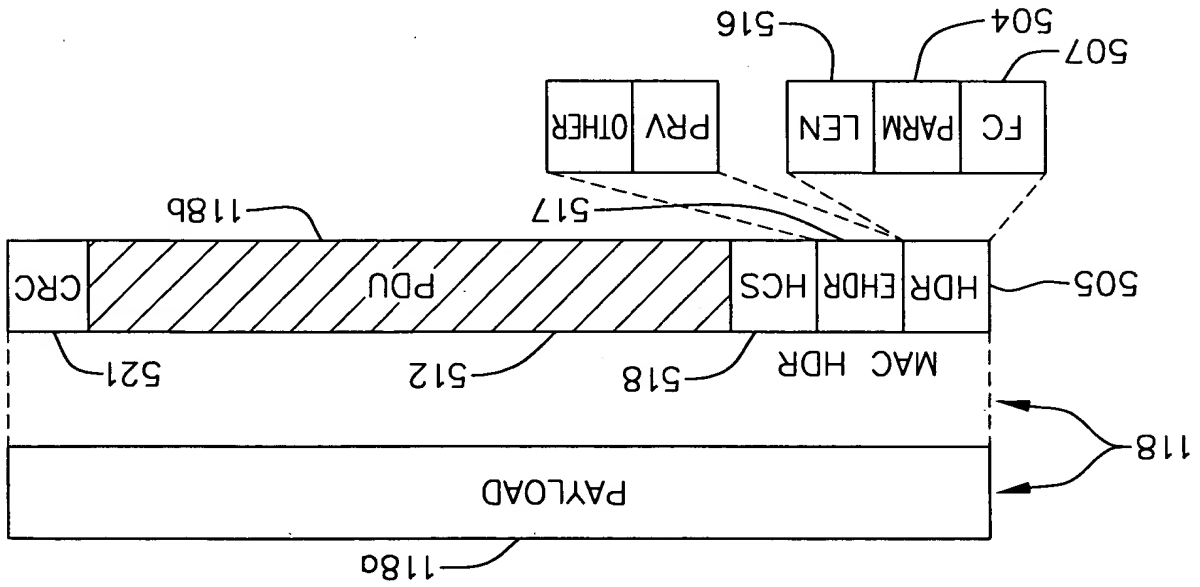


FIG. 69

FIG. 71

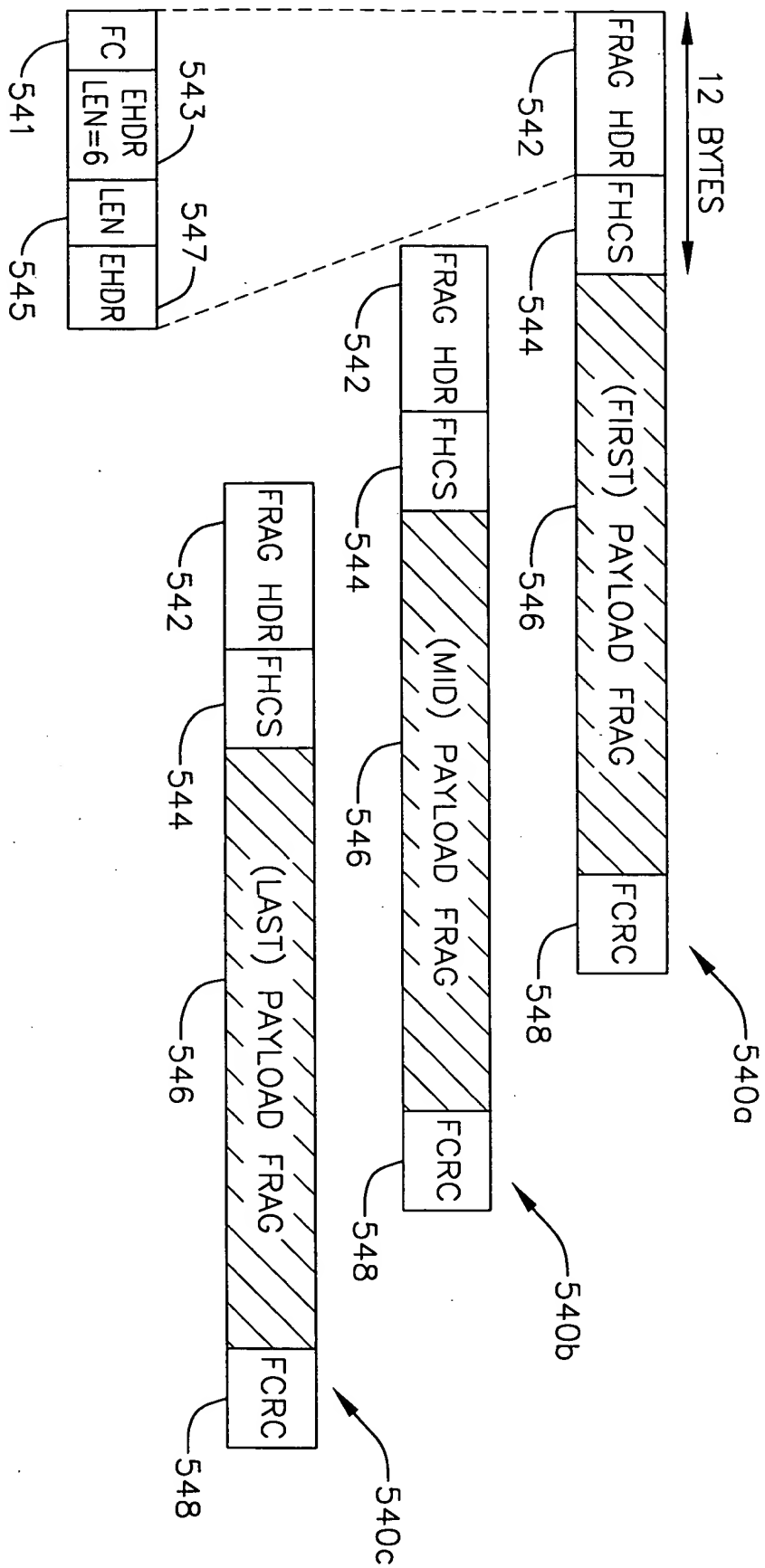


FIG. 72

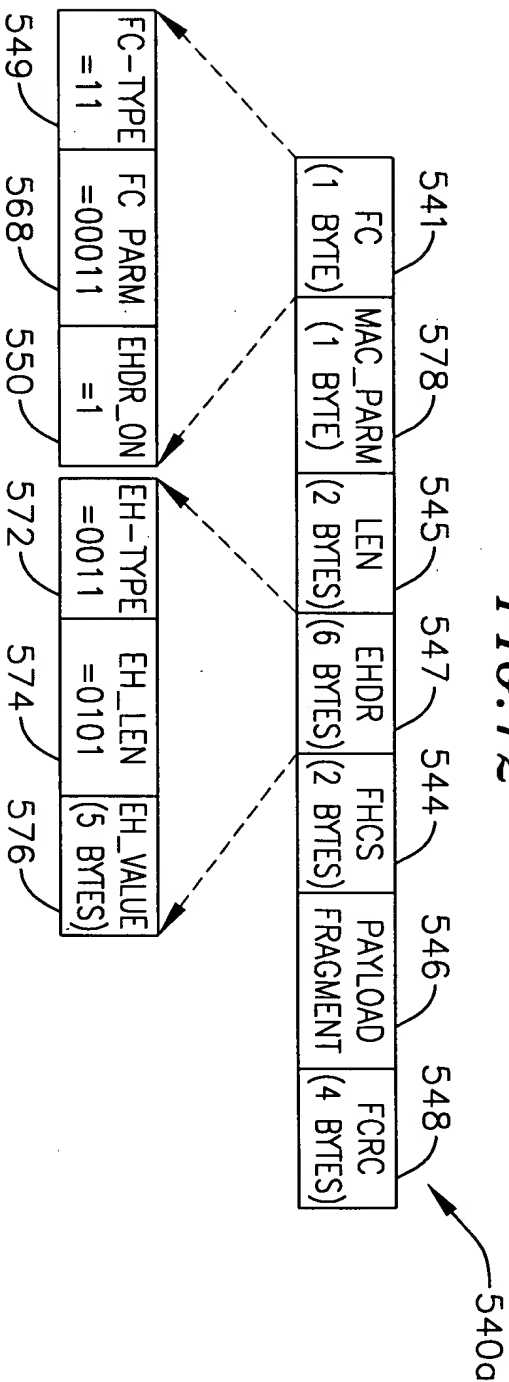


FIG. 73

FIELD	USAGE	SIZE
FC	FC_TYPE=11;MAC-SPECIFIC HEADER FC_PARM [4:0]=00011;FRAGMENTATION MAC HEADER EHDR_ON = 1;FRAGMENTATION EHDR FOLLOWS	8 BITS
MAC_PARM	ELEN = 6 BYTES;LENGTH OF FRAGMENTATION EHDR	8 BITS
LEN	LEN = n+10;TOTAL LENGTH OF THIS FRAGMENT INCLUDING PAYLOAD, EHDR, FCRC	16 BITS

FIG. 74

FIELD	USAGE	SIZE	
EHDR	EH_TYPE=3;SAME TYPE AS BP_UP EH_LEN=5;LENGTH OF THIS EHDR KEY_SEQ;SAME AS IN BP_UP VER=0001;VERSION NUMBER FOR THIS EHDR ENABLE IF ENABLE=0, BPI DISABLED IF ENABLE=1, BPI ENABLED TOGGLE BIT;SAME AS IN BP_UP SID;SERVICE ID ASSOCIATED WITH THIS FRAGMENT REQ;NUMBER OF MINI-SLOTS FOR A PIGGYBACK REQUEST RESERVED;MUST BE SET TO ZERO FIRST_FRAG;SET TO ONE FOR FIRST FRAGMENT ONLY LAST_FRAG;SET TO ONE FOR LAST FRAGMENT ONLY FRAG_SEQ;FRAGMENT SEQUENCE COUNT, INCREMENTED FOR EACH FRAGMENT, SET TO ZERO FOR FIRST FRAGMENT	4 BITS 4 BITS 4 BITS 4 BITS 1 BIT	6 BYTES
		1 BIT 14 BITS 8 BITS 2 BITS 1 BIT 1 BIT 4 BITS	
FHCS	MAC HEADER CHECK SEQUENCE		2 BYTES
PAYLOAD	FRAGMENT PAYLOAD;PORTION OF TOTAL MAC PDU BEING SENT		n BYTES
FCRC	CRC ACROSS FRAGMENT PAYLOAD		4 BYTES
	LENGTH OF A MAC FRAGMENT FRAME	n + 16 BYTES	

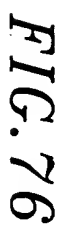


FIG. 77

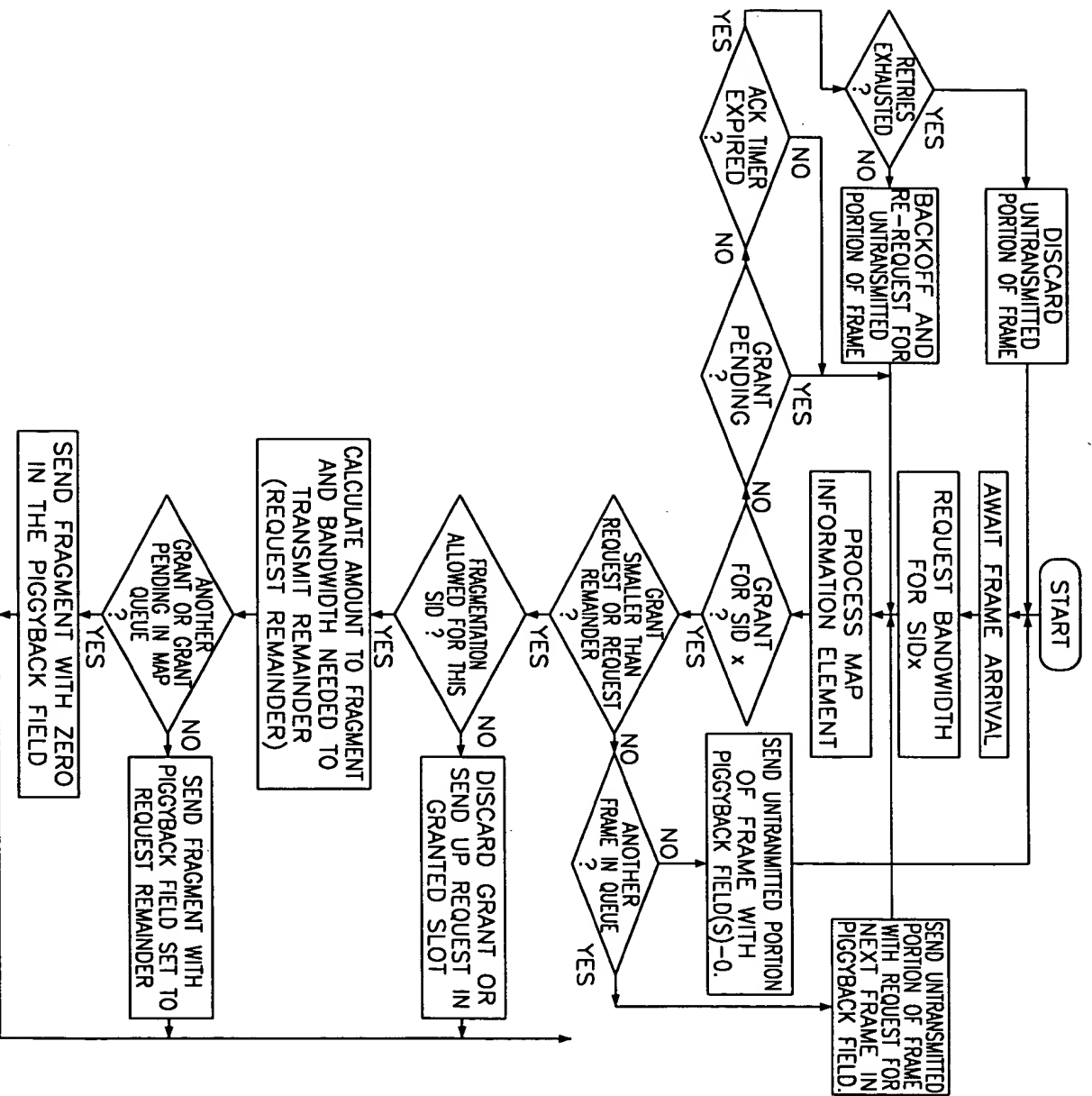


FIG. 78

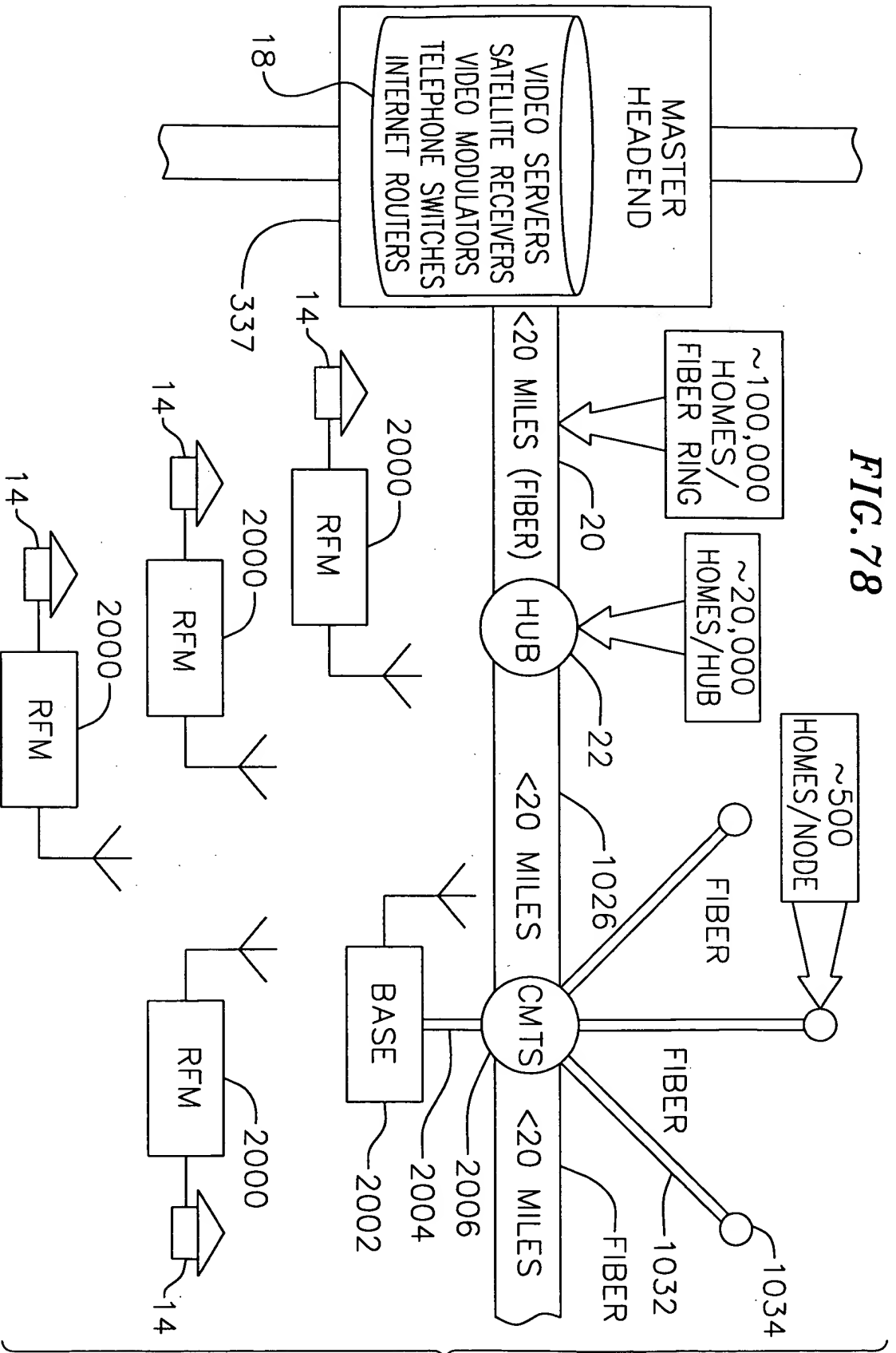


FIG. 79

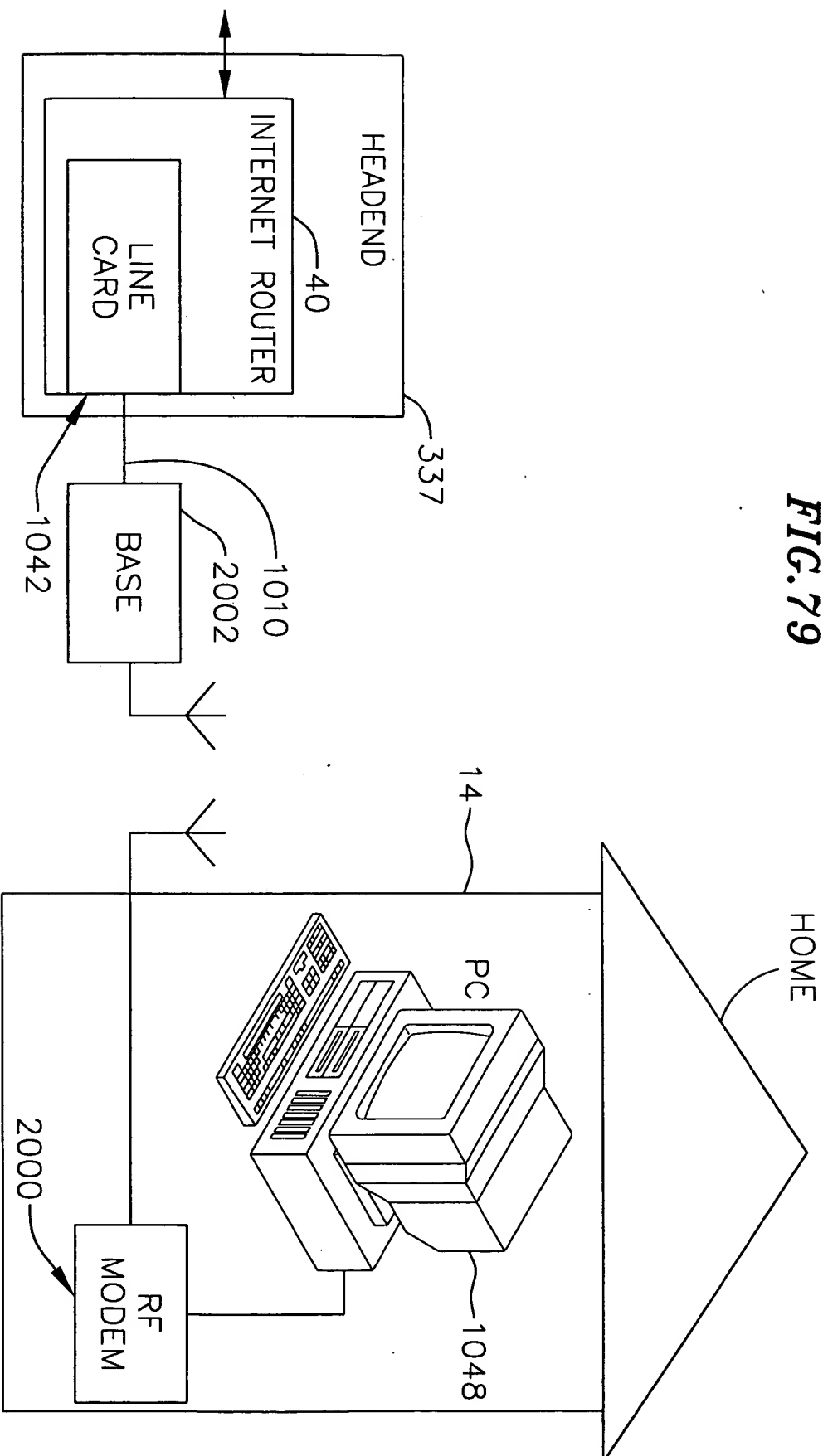


FIG. 80

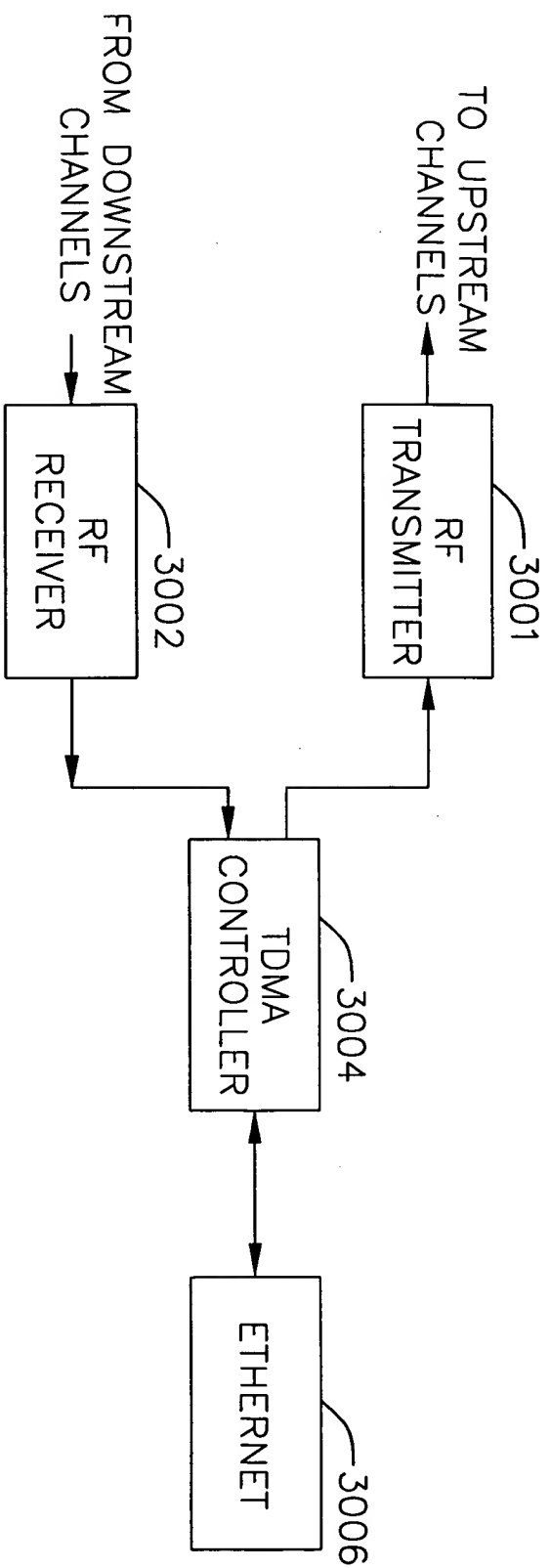


FIG. 81

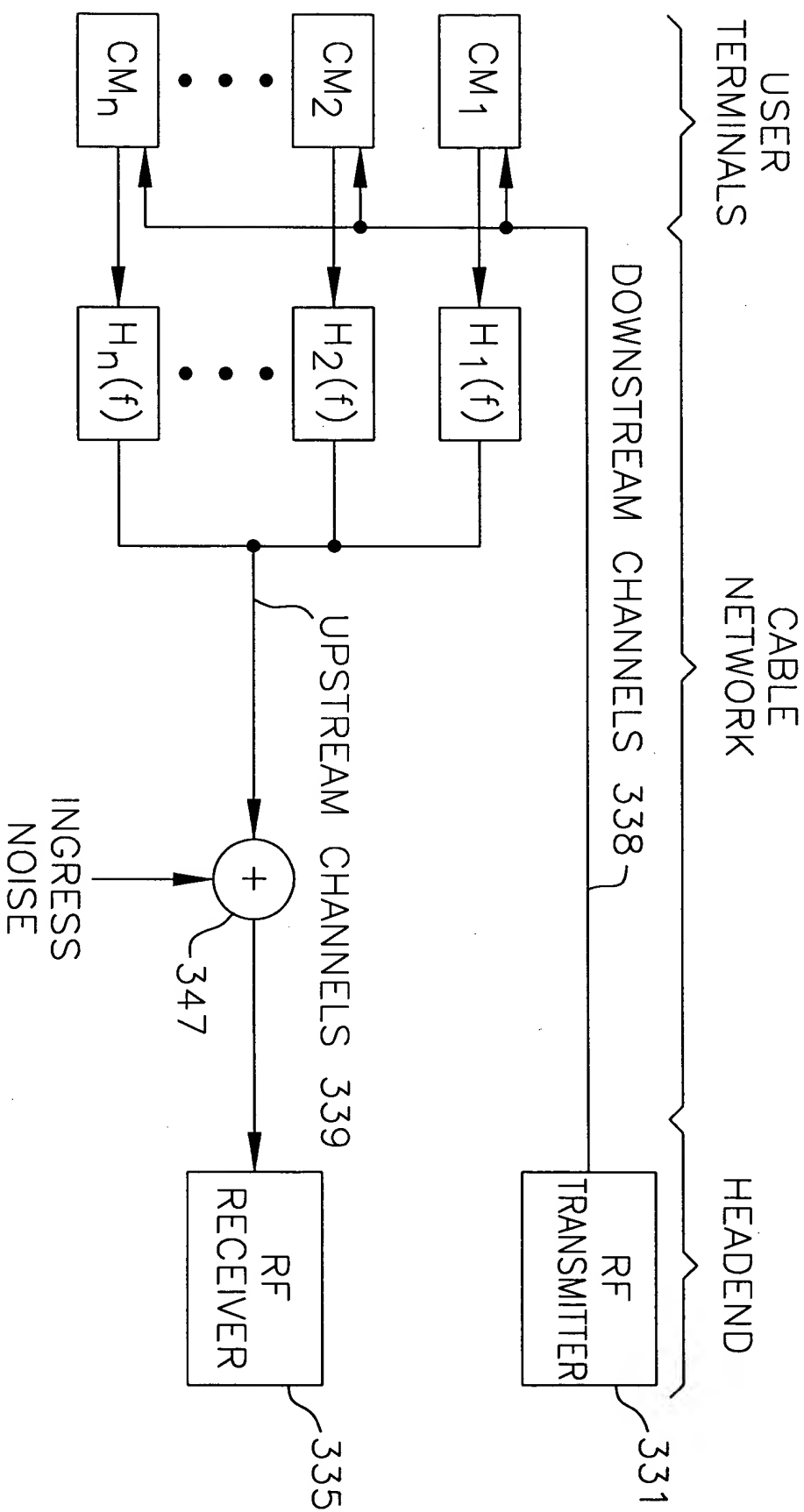
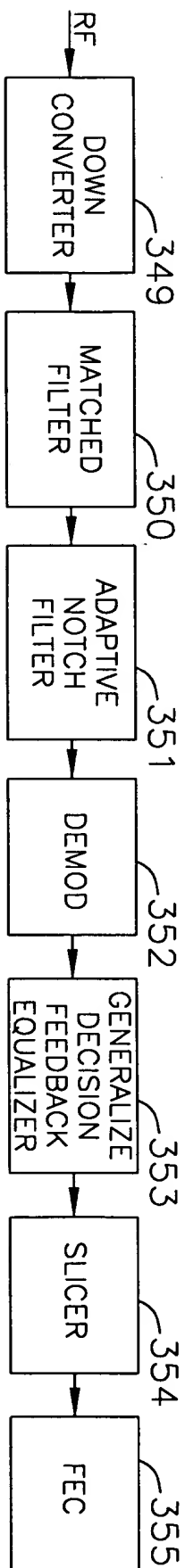


FIG. 82



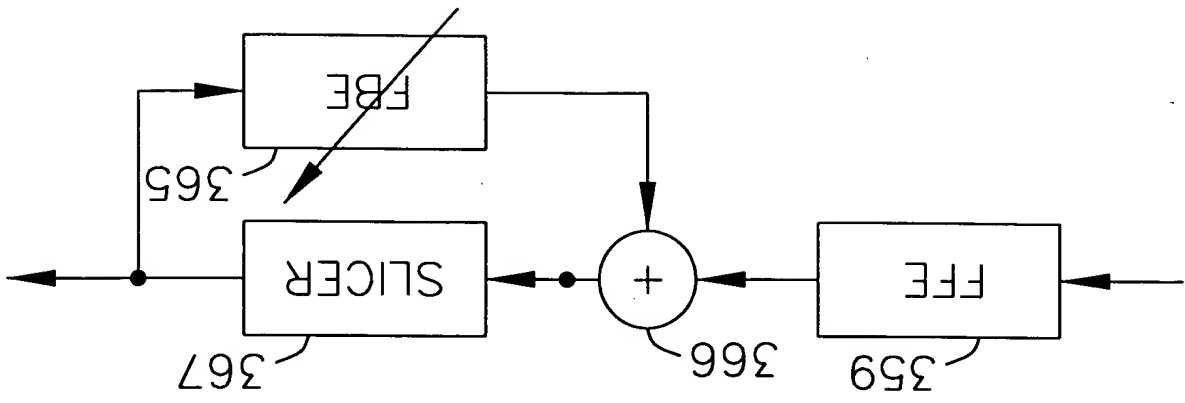


FIG. 84

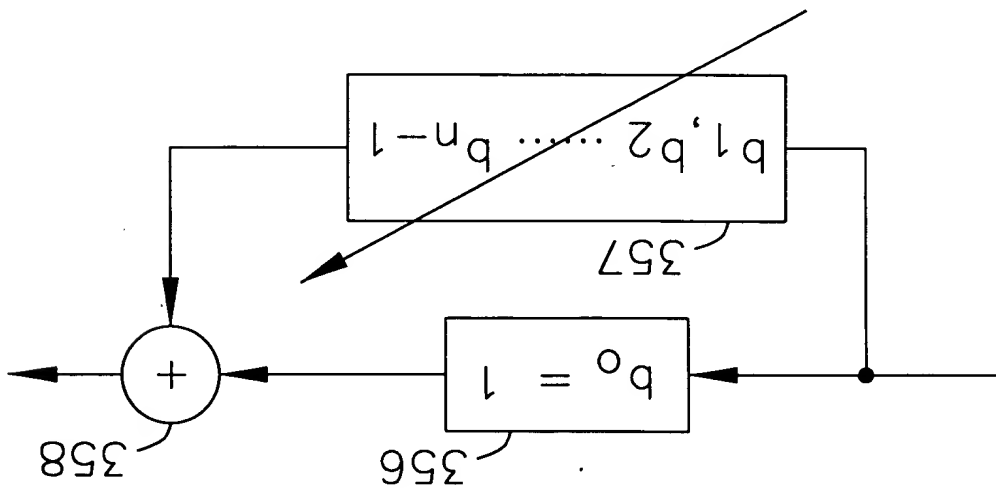


FIG. 83

FIG. 85

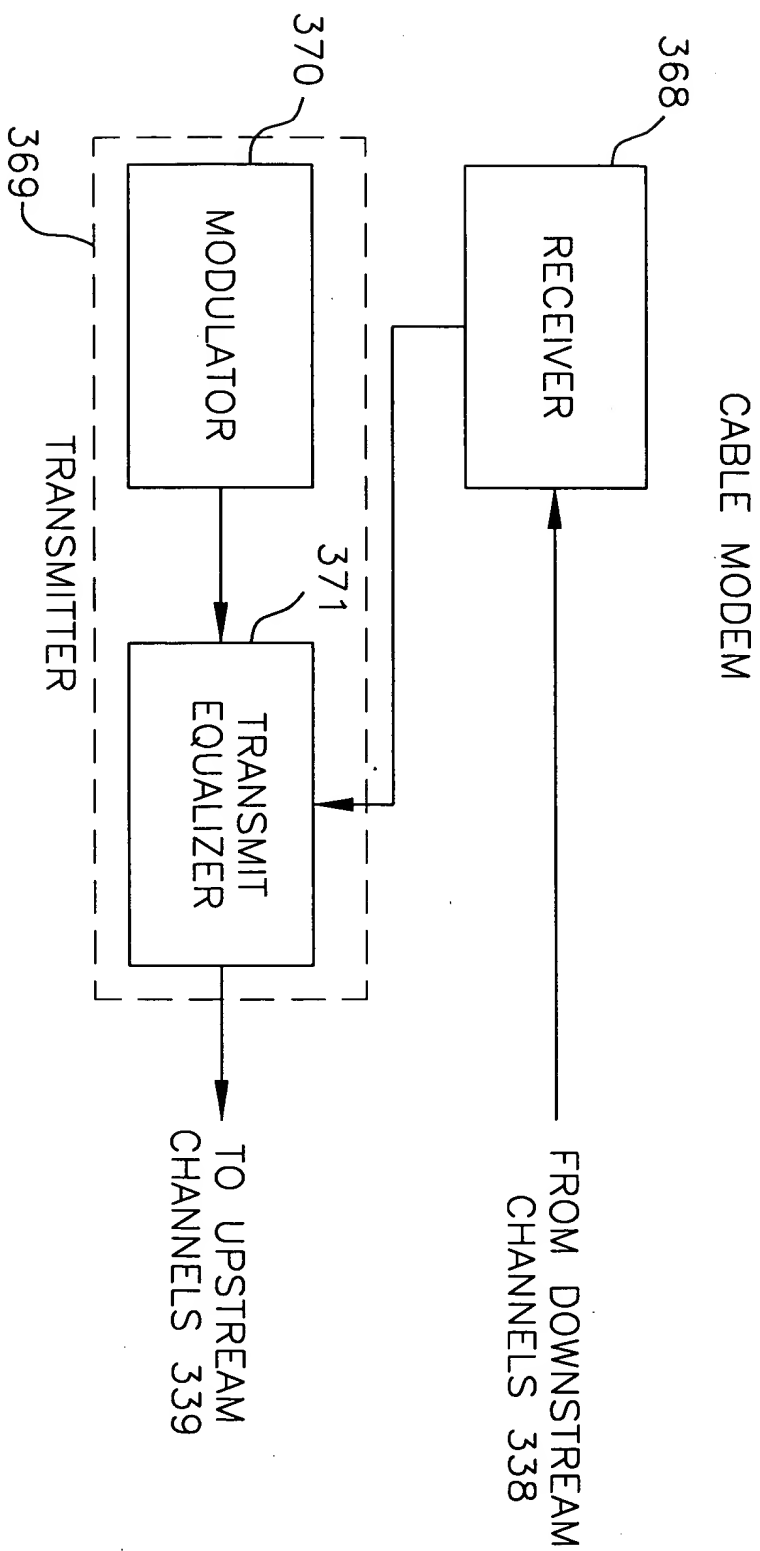
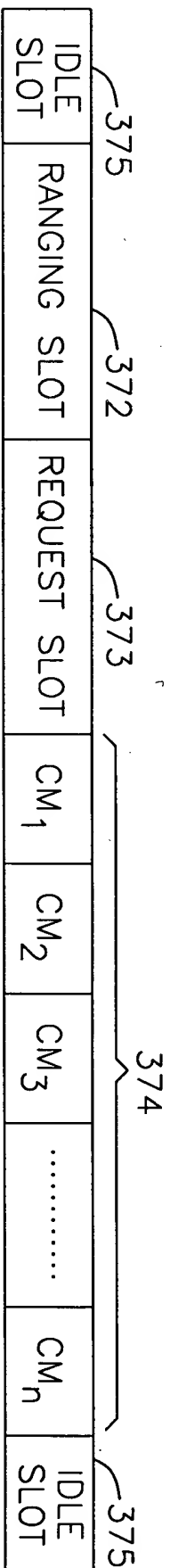


FIG. 86



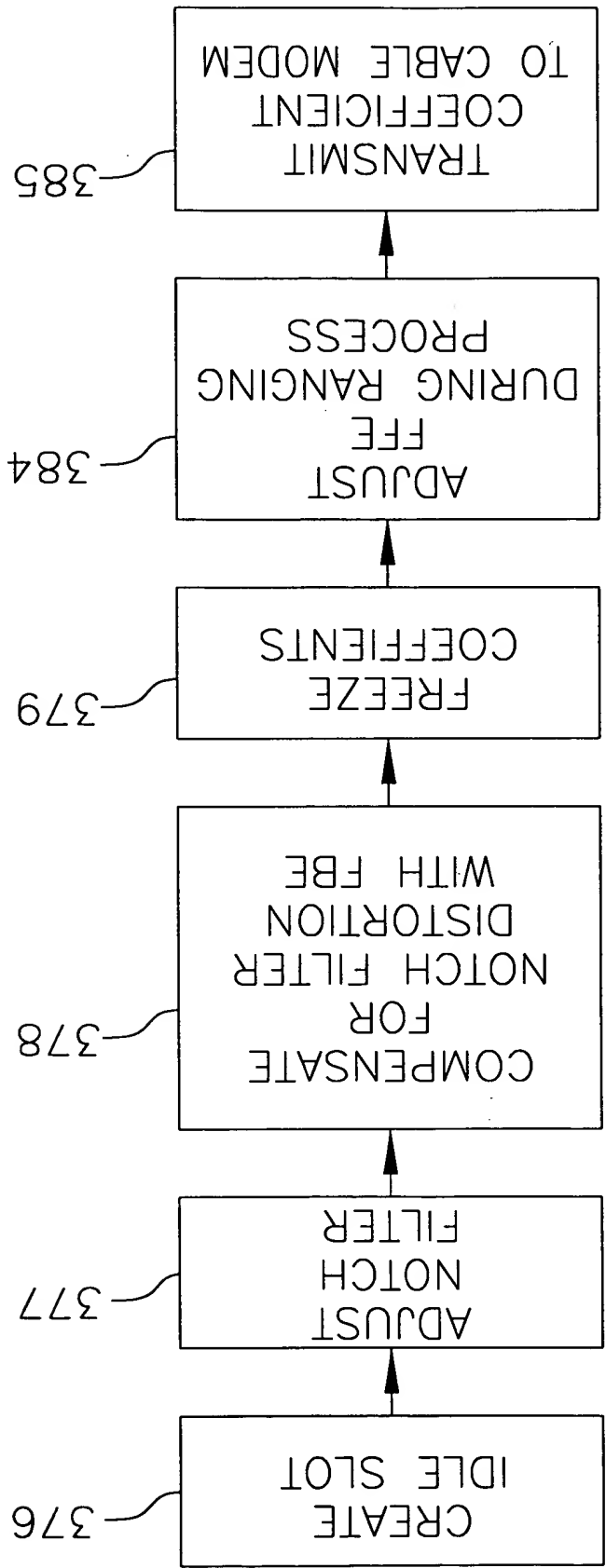


FIG. 87

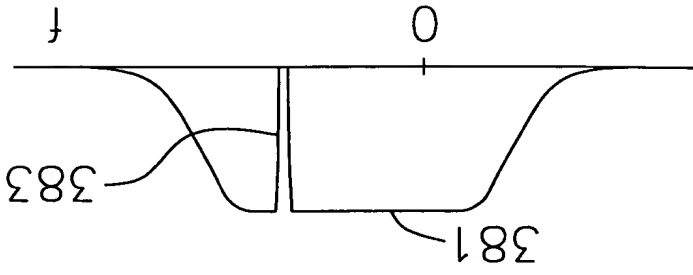


FIG. 88C

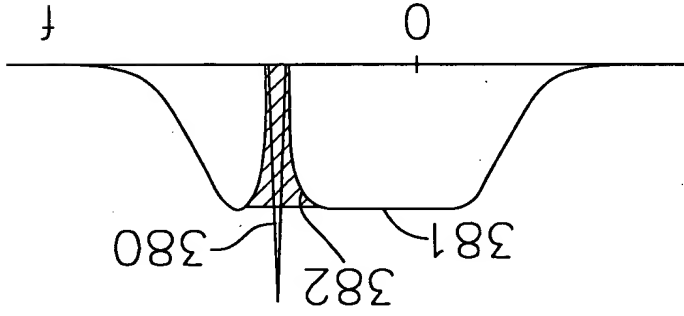


FIG. 88B

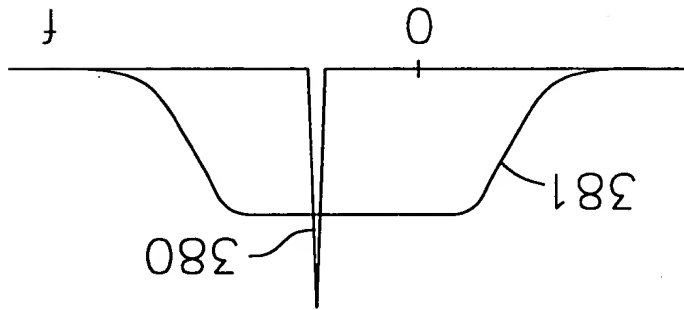
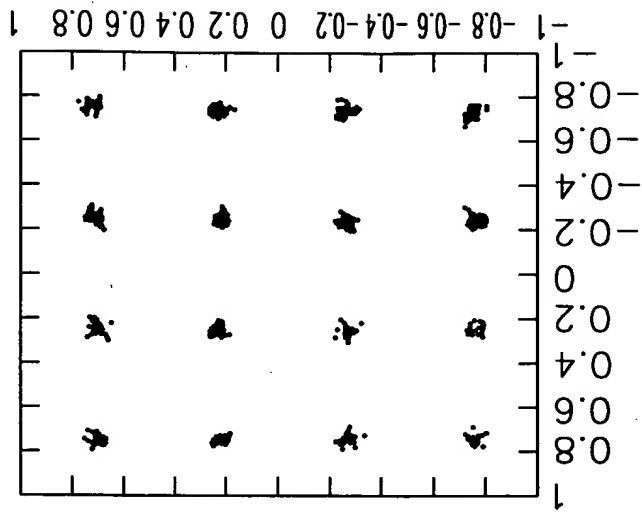
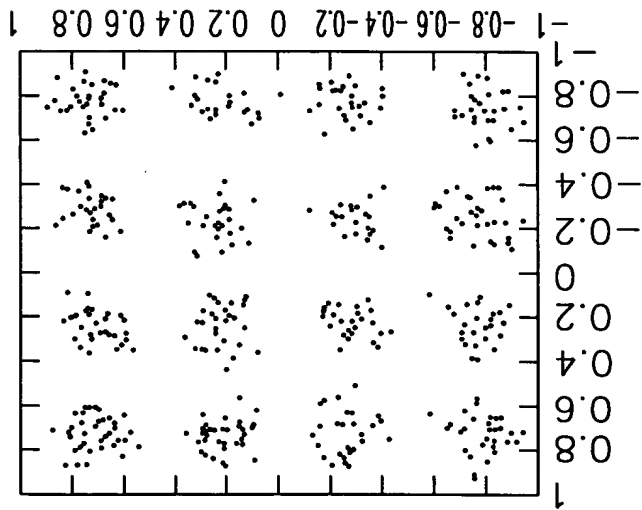


FIG. 88A



16-QAM CONSTELLATION
AFTER NOISE REJECTION

FIG. 89B



16-QAM CONSTELLATION
BEFORE NOISE REJECTION

FIG. 89A

